# Scharf, Kelsey (INFC)

From:

Jurca, Oana (INFC)

Sent:

February 4, 2019 1:01 PM

To:

Chung-How, Catherine (INFC)

Cc:

Suffel, Jordan (INFC); Scharf, Kelsey (INFC)

**Subject:** 

FW: MinO Q: Atlantic Projects

Good afternoon Catherine,

Following up on the Atlantic projects due for Fariya 's review for the points 2 and 3,

This is due ASAP,

Oana

From: Jurca, Oana (INFC)

**Sent:** February 1, 2019 4:40 PM

To: Chung-How, Catherine (INFC) < catherine.chung-how@canada.ca>

Cc: Syed, Fariya (INFC) <fariya.syed@canada.ca>

Subject: FW: MinO Q: Atlantic Projects

Good afternoon Catherine,

Please see below the Mino Q for Atlantic Projects:

- 1. The terms surrounding the NBCF in PEI. (Like the NBCF equivalent of the IBAs for ICIP.)
- 2. This week at pipeline I asked if we have received anything from PEI relating to a Climate Change research facility at UPEI. We hadn't, but I'm wondering if something has come in since.
- 3. Also wondering if we've received a proposal for a broadband project in PEI.

Due for Fariya 11 am on Feb 4,2019

Thanks,

Oana

From: Sausins, Katrine (INFC)

**Sent:** February 1, 2019 4:32 PM

To: Syed, Fariya (INFC) < <a href="mailto:fariya.syed@canada.ca">fariya.syed@canada.ca</a>>; Judd, Christian (INFC) < <a href="mailto:christian.judd@canada.ca">christian.judd@canada.ca</a>>

**Cc:** Sierra, Monica Alejandra (INFC) < <u>monicaalejandra.sierra@canada.ca</u>>; Jurca, Oana (INFC) < <u>oana.jurca@canada.ca</u>>; Silva, Maria Gabriela (INFC) < <u>mariagabriela.silva@canada.ca</u>>; INFC.O PO.ADMO.Users/Utilisateurs.OP.BSMA O.INFC

<INFC.PO.ADMO.Users-Utilisateurs.OP.BSMA.INFC@canada.ca>

Subject: MinO Q: Atlantic Projects

Good evening!

Could you please provide responses to the below by 2pm February 4<sup>th</sup>?

- 1. The terms surrounding the NBCF in PEI. (Like the NBCF equivalent of the IBAs for ICIP.)
- 2. This week at pipeline I asked if we have received anything from PEI relating to a Climate Change research facility at UPEI. We hadn't, but I'm wondering if something has come in since.

J. Also Worldering II V	we ve received a proposario	n a broadband project n	1 r Li.
Thanks,			
Katrine			
		•	

From:

La Rue, Jean-François (INFC)

Sent:

February 7, 2019 8:43 AM

To:

Chung-How, Catherine (INFC); Syed, Fariya (INFC)

Cc:

Sierra, Monica Alejandra (INFC); Jurca, Oana (INFC)

Subject:

RE: MinO Q: Atlantic Projects

Attachments:

UPEI - one pager with JF edits as of 2019-02-07 - 0842.docx

Catherine.

Voir SVP mes commentaires et suggestions.

Merci et désolé.

JF

From: Chung-How, Catherine (INFC) Sent: February 7, 2019 8:32 AM

To: La Rue, Jean-François (INFC) < jean-francois.larue@canada.ca>; Syed, Fariya (INFC) < fariya.syed@canada.ca>

Cc: Sierra, Monica Alejandra (INFC) < monicaalejandra.sierra@canada.ca>; Jurca, Oana (INFC) < oana.jurca@canada.ca>

Subject: RE: MinO Q: Atlantic Projects

Bonjour Jean-Francois,

Here is the revised note. Please let me know if you need additional changes. Merci

# Catherine Chung How

Manager, North/Atlantic/Ontario Directorate **Program Operations Branch** Infrastructure Canada / Government of Canada catherine.chung-how@canada.ca / Tel: 613-960-2513

Gestionnaire, Direction régionale du Nord/Atlantique/Ontario Opérations des programmes

Infrastructure Canada / Gouvernement du Canada catherine.chung-how@canada.ca: Tél: 613-960-2513

From: La Rue, Jean-François (INFC) **Sent:** February 6, 2019 4:51 PM

To: Syed, Fariya (INFC) <fariya.syed@canada.ca>; Chung-How, Catherine (INFC) <<u>catherine.chung-how@canada.ca</u>> Cc: Sierra, Monica Alejandra (INFC) < monicaalejandra.sierra@canada.ca >; Jurca, Oana (INFC) < oana.jurca@canada.ca >

Subject: RE: MinO Q: Atlantic Projects

Salut Fariva et Catherine

Few observations for your consideration in the document....

On Page two, we make reference to another document for Building construction, but it is not attached...

We should also try to list, based on what we have, what is eligible and what is not; and also briefly explain what is eligible and not and why (mostly for those expenditures that are not.....e.g.: residence

Last bullet on page three; does the refer to the equipment? Because we also have the residence at

Merci beaucoup for considering revising the document.

JF

From: Sierra, Monica Alejandra (INFC)

Sent: February 6, 2019 3:45 PM

To: La Rue, Jean-François (INFC) < jean-francois.larue@canada.ca >

Subject: FW: MinO Q: Atlantic Projects

JF,

For your approval.

M.

From: Syed, Fariya (INFC)

Sent: February 6, 2019 3:19 PM

To: Sierra, Monica Alejandra (INFC) < monicaalejandra.sierra@canada.ca >

Cc: Jurca, Oana (INFC) < oana.jurca@canada.ca >; Chung-How, Catherine (INFC) < catherine.chung-how@canada.ca >

Subject: FW: MinO Q: Atlantic Projects

Monica,

MinO asked for this to be sent today at the pipeline meeting. It's for DG review.

Fariya

At the MinO pipeline meeting today we were asked to provide a summary of the information we received on the UPEI project. Please find it attached.

From: Sausins, Katrine (INFC) Sent: February 5, 2019 3:59 PM

To: Syed, Fariya (INFC) < fariya.syed@canada.ca >; Makuc, Bogdan (INFC) < bogdan.makuc@canada.ca >

Cc: Sierra, Monica Alejandra (INFC) < monicaalejandra.sierra@canada.ca >; Jurca, Oana (INFC) < oana.jurca@canada.ca >;

Eid, Sandy (INFC) < sandy.eid@canada.ca >; INFC.O PO.ADMO.Users/Utilisateurs.OP.BSMA O.INFC

<INFC.PO.ADMO.Users-Utilisateurs.OP.BSMA.INFC@canada.ca>; Ingabire, Angelique (INFC)

<angelique.ingabire@canada.ca>

Subject: RE: MinO Q: Atlantic Projects

Good afternoon!

Jason has a couple of follow-up questions related to the below (Monica's email in yellow). (These questions might need to be shared with both NATO and PI)

ATIA - 21(1)(a)
ATIA - 21(1)(b)

**ATIA - 14** 

1) Could you provide a document which lays out the terms and conditions for NBCF?

2) Is it possible to obtain a copy of the submission for UPEI? Jason would like to know what's missing from the submission (if anything), and what the initial impression is regarding eligibility of the asset.

Thank you!

Katrine

From: Sausins, Katrine (INFC) Sent: February 4, 2019 9:38 PM

To: Syed, Fariya (INFC) < fariya.syed@canada.ca >

**Cc:** Sierra, Monica Alejandra (INFC) < <a href="mailto:monicaalejandra.sierra@canada.ca">monicaalejandra.sierra@canada.ca</a>; Jurca, Oana (INFC) < <a href="mailto:oana.jurca@canada.ca">oana.jurca@canada.ca</a>; Jurca, Oana (INFC) < <a href="mailto:oanada.ca">oana.jurca@canada.ca</a>; Jurca, Oana (INFC) < <a href="mailto:oanada.ca">oanada.ca</a>; Jurca, Oana (INFC) < <a href="mailto:oanada.ca">oanada.ca</a>; Jurca, Oanada.ca</a>; J

**Subject:** RE: MinO Q: Atlantic Projects

Good evening!

Please see below further comment from Mathieu on the below.

I understand there will be a call between officials of INFC and province of PEI tomorrow on the UPEI project.

Thank you,

Katrine

From: Sierra, Monica Alejandra (INFC) Sent: February 4, 2019 2:55 PM

To: Sausins, Katrine (INFC) < katrine.sausins@canada.ca>

Cc: Syed, Fariya (INFC) < fariya.syed@canada.ca >; INFC.O PO.ADMO.Users/Utilisateurs.OP.BSMA O.INFC

<INFC.PO.ADMO.Users-Utilisateurs.OP.BSMA.INFC@canada.ca>

Subject: RE: MinO Q: Atlantic Projects

Katrine,

Please see below NATO response to questions 2 & 3.

Approved by DG.

Question 1 is still under development. A request for additional information was sent to ADMO. (see email attached)

Thank you, Monica

2. Question: This week at pipeline I asked if we have received anything from PEI relating to a Climate Change research facility at UPEI. We hadn't, but I'm wondering if something has come in since.

**Answer:** We received a submission for the project late last week. It does not seem like it will be eligible as the federal funding request is well over the federal stacking limit. Further discussions with the Province is required to discuss proposed funding and confirm current proposal.

3. Question: Also wondering if we've received a proposal for a broadband project in PEI.

From: Syed, Fariya (INFC)

**Sent:** February 4, 2019 9:42 AM

To: Sausins, Katrine (INFC) < katrine.sausins@canada.ca>

Cc: Jurca, Oana (INFC) < oana.jurca@canada.ca >; Sierra, Monica Alejandra (INFC) < monicaalejandra.sierra@canada.ca >

Subject: RE: MinO Q: Atlantic Projects

Can we get some clarification on the first question?: 1: The terms surrounding the NBCF in PEI. (Like the NBCF equivalent of the IBAs for ICIP.)

The other 2 responses are coming.

From: Sausins, Katrine (INFC) Sent: February 1, 2019 4:32 PM

To: Syed, Fariya (INFC) < fariya.syed@canada.ca >; Judd, Christian (INFC) < christian.judd@canada.ca >

Cc: Sierra, Monica Alejandra (INFC) < monicaalejandra.sierra@canada.ca>; Jurca, Oana (INFC) < oana.jurca@canada.ca>; Silva, Maria Gabriela (INFC) < mariagabriela.silva@canada.ca>; INFC.O PO.ADMO.Users/Utilisateurs.OP.BSMA O.INFC < INFC.PO.ADMO.Users-Utilisateurs.OP.BSMA.INFC@canada.ca>

Subject: MinO Q: Atlantic Projects

Good evening!

Could you please provide responses to the below by 2pm February 4th?

- 1. The terms surrounding the NBCF in PEI. (Like the NBCF equivalent of the IBAs for ICIP.)
- 2. This week at pipeline I asked if we have received anything from PEI relating to a Climate Change research facility at UPEI. We hadn't, but I'm wondering if something has come in since.
- 3. Also wondering if we've received a proposal for a broadband project in PEI.

Thanks,

Katrine

### **UPEI - Canadian Centre for Climate Change and Adaptation**

### Description

UPEI is proposing to establish the Canadian Centre for Climate Change and Adaptation under the innovation category of NBCF-NRP. The Centre will be housed within a new 35,000 square foot facility which will be constructed at a site in St. Peters, Prince Edward Island and will include **four Research Centres of Excellence**, multipurpose space, innovation collaboration space, storage, repair shop, greenhouses and common areas. **A new 17,500 square foot student residence** will be constructed on the same site.

The four Research Centres of Excellence to support the creation of new climate change knowledge, adaptation, and innovation needed to accelerate Canada's transition to a clean growth economy. Within the Centre, UPEI will lead four research centres of excellence in:

- Data and Policy Analysis for Transition to Low-Carbon Economies,
- · Coastal Systems Impacts,
- Clean Technology Innovation in Support of Agriculture and Aquaculture, and
- Climate Change and Human Health.

The Centre will enable the promotion of the productivity and health of Canadian communities over the long-term. The proposed Canadian Centre for Climate Change and Adaptation will mobilize new knowledge and expertise that is applied locally and adapted at national and global levels. The enhanced direction and focus on climate change for UPEI, as outlined in this document, exemplifies the four pillars of the University that build on core strengths: Student Experience, Vibrant Communities, Exploration and Discovery, and Long-term Sustainability.

Centres of Research Excellence in Climate Change and Adaptation will be housed within the Canadian Centre for Climate Change and Adaptation hosted by UPEI and located in St. Peter's, PEI. Researchers, students, and partners will have ready access to the internationally-recognized UPEI Climate Research Lab, as well as access to outstanding global climate partner networks, and researchers in diverse areas of climate and climate-related areas of expertise being developed through new higher learning and research programs.

The Centre's location provides an advantage to researchers and students with its close proximity to protected land and unique ecosystems within Parks Canada's National Park at Greenwich. Its location in Eastern PEI further supports the University's strategy to develop transformative and immersive climate change programs 'in the field' with strong collaboration and community outreach.

The proposed Canadian Centre for Climate Change and Adaptation UPEI's Department of Science and School of Graduate Studies will deliver highly innovative and relevant programming a Bachelor of Science in Applied Climate Change and Adaptation and a Master of Science in Climate Change and Adaptation.

### Land

UPEI has land available in the St. Peters area of rural PEI to house the new facility. Land specifications, site map, and aerial images are included in the business cases.

### **Project Timeline**

It is estimated that construction would commence upon approval of funding in the Summer of 2019 and

ATIA - 13(1)(c)

ATIA - 20(1)(b) ATIA - 20(1)(c) ATIA - 20(1)(d)

be completed for use by September 2020.

### Recipient

The Canadian Center for Climate Change and Adaptation will be established, operated, and maintained by the University of Prince Edward Island. The University of Prince Edward Island is governed by a Board of Governors and a Senate, instituted under the terms of the Prince Edward Island government's University Act.

### **Financial**

Proposed Project Costs and Financing

Land and site improvement costs are estimated at a second and will consist of activities required to prepare the land for the Centre's construction, including earthwork, landscaping, and paving.

In keeping with climate action priorities, it is proposed that the new Centre and student residence be constructed and operated in a sustainable manner, meeting or exceeding the energy efficiency requirements of the Model National Energy Code for Buildings.

The construction budget estimate is the square foot for the Centre and per square foot for the student residence, exclusive of specialized technology and equipment. On this basis, the capital costs for the construction of the buildings are estimated to be

Through extensive consultation with faculty and industry experts, UPEI has identified the technologies and equipment required for the Canadian Centre for Climate Change and Adaptation and Research Centres of Excellence. Specialized equipment and leading-edge technology are estimated to be Examples of technologies and equipment include small, unmanned air vehicles (sUAVs), aerial senor packages, real-time kinetic global positioning systems, field monitoring kits and supplies, research boat, trailer, backup generator and state-of-the-art communications infrastructure, computer equipment, networks, servers, and security systems for data storage and management in rural PEI.

### **Estimated Capital Costs for the project**

# Proposed Capital Financing Infrastructure Canada \$ 10,000,000 University of Prince Edward Island 4,300,000 Atlantic Canada Opportunities Agency 4,000,000 TOTAL \$ 18,300,000

Key Considerations:

- Under NBCF-PTIC-NRP, the maximum federal cost-sharing and stacking limit for UPEI is up to one-third (33.33 percent) of the total eligible costs of a project.

ATIA - 13(1)(c)

ATIA - 20(1)(b)
ATIA - 20(1)(c)
ATIA - 20(1)(d)

ATIA - 21(1)(a)
ATIA - 69(1)(g) - (a)

<ul> <li>The combined federal contrib</li> </ul>	pution requested from the two federal departments (ACOA and	
INFC)	which is well above the program stacking limit.	

Also, based on a preliminary review of the project costs, some of the costs listed in the business case (highlighted above) would not be eligible expenses under the
program as they are not fixed assets and the program doesn't pay for equipment. In
addition, the residence won't be eligible according to the TS and Cs as it is housing.

ATIA - 21(1)(b)

ATIA - 69(1)(g) - (a)

ATIA - 69(1)(g) - (c)

# La Rue, Jean-François (INFC)

From:

La Rue, Jean-François (INFC)

Sent:

February 12, 2019 4:15 PM

To:

Chung-How, Catherine (INFC)

Subject:

UPEI // update

**Attachments:** 

RE: Readout:

See below and attached e-mail traffic

From: La Rue, Jean-François (INFC) Sent: February 12, 2019 4:13 PM

To: Williams, Tushara (INFC) < tushara.williams@canada.ca>

Cc: Fortin3, Marc (INFC) <marc.fortin3@canada.ca>; Loginova, Natasha (INFC) <natasha.loginova@canada.ca>

Subject: RE: Urgent pls call me, Thanks, Shelly

I just sent some info to ADMO on it... See attached e-mail.

JF

From: Williams, Tushara (INFC) Sent: February 12, 2019 4:09 PM

To: La Rue, Jean-François (INFC) < jean-françois.larue@canada.ca>

Subject: RE: Urgent pls call me, Thanks, Shelly

She just called me 😊

Does this

ring a bell at all?

From: La Rue, Jean-François (INFC) Sent: February 12, 2019 4:08 PM

To: Williams, Tushara (INFC) < <a href="mailto:tushara.williams@canada.ca">tushara.williams@canada.ca</a>>

Subject: RE: Urgent pls call me, Thanks, Shelly

Sorry Tushara...

JF

From: Williams, Tushara (INFC)
Sent: February 12, 2019 4:02 PM

To: Lechasseur, Nathalie (INFC) < nathalie.lechasseur@canada.ca >; Ouellette, Michele (INFC)

ATIA - 21(1)(b)

ATIA - 69(1)(g) - (a)

ATIA - 69(1)(g) - (c)

<michele.ouellette@canada.ca>; La Rue, Jean-François (INFC) <jean-francois.larue@canada.ca>

Subject: FW: Urgent pls call me, Thanks, Shelly

Colleagues

Do either of you know what this might be about?

oout?

Just checking before I call her back.

From: Haidon, Shelly [mailto:Shelly.Haidon@pco-bcp.gc.ca]

**Sent:** February 12, 2019 4:00 PM

To: Williams, Tushara (INFC) < tushara.williams@canada.ca>

Subject: Urgent pls call me, Thanks, Shelly

Hi,

Shelly Haidon, Bsc, MBA, JD
Policy Advisor | Conseiller de la politique
Economic and Regional Development Policy | Politique du développement économique et régional
Privy Council Office | Bureau du Conseil Privé
613-960-4118

ATIA - 14

ATIA - 21(1)(a) ATIA - 21(1)(b) ATIA - 69(1)(g) - (a)

# La Rue, Jean-François (INFC)

From:

La Rue, Jean-François (INFC)

Sent:

February 12, 2019 2:59 PM

To:

Loginova, Natasha (INFC); Fortin3, Marc (INFC)

Subject:

RE: Readout:

Attachments:

UPEI - one pager - 2019-02-12 - 1500.docx

- Oui, une partie des coûts du projet sont éligibles à du financement d'INFC.
- Ci-joint le 1 pager qui a été préparé pour MINO la semaine dernière sur ce projet.

# La réalité :

- Coût total du projet :
- Cout éligible :
- Contribution d'INFC: 33.33% =

La proposition de UPEI

# Proposed Capital Financing

Infrastructure Canada \$ 1

University of Prince Edward Island 4,300,000

Atlantic Canada Opportunities Agency 4,000,000

TOTAL \$ 18,300,000



From: Loginova, Natasha (INFC) Sent: February 12, 2019 12:33 PM

To: Ouellette, Michele (INFC) <michele.ouellette@canada.ca>; Lechasseur, Nathalie (INFC)

<nathalie.lechasseur@canada.ca>; La Rue, Jean-François (INFC) < jean-francois.larue@canada.ca>

Cc: Delaney, Jim (INFC) < iim.delaney@canada.ca >; Osiowy, Tanya (INFC) < tanya.osiowy@canada.ca >; Chung-How,

Catherine (INFC) < catherine.chung-how@canada.ca >; INFC.O PO.ADMO.Users/Utilisateurs.OP.BSMA O.INFC

<INFC.PO.ADMO.Users-Utilisateurs.OP.BSMA.INFC@canada.ca>

Subject: FW: Readout:

Good afternoon,

As you know, every two weeks Nathalie Bertrand, Marc and MinO have a call Following the call, could you please confirm the following:

ATIA - 21(1)(a)
ATIA - 21(1)(b)

ATIA - 69(1)(g) - (a) ATIA - 69(1)(g) - (c)

UPEI project- JF to confirm

Thank you all. Natasha.
From: Fenrich, Julia (INFC)  Sent: February 12, 2019 11:41 AM  To: Gillis, Kelly (INFC) < kelly.gillis@canada.ca >; Fortin3, Marc (INFC) < marc.fortin3@canada.ca >; Bertrand3, Nathalie (INFC) < nathalie.bertrand3@canada.ca >; Eyre, Jennifer (INFC) < jennifer.eyre@canada.ca >  Cc: Loginova, Natasha (INFC) < natasha.loginova@canada.ca >; Logtens, Terri-Lynn (INFC) < terri-lynn.logtens@canada.ca >  Subject: Readout
Good morning,
Please find below my readout of this morning's teleconference meeting note the follow-up highlighted in yellow.
-Discussion was guided by the roadmap document

Thank you,

Julia Fenrich

Departmental Liaison Officer | Agente de liaison ministériel Telephone | Téléphone 613-941-0745

# **UPEI - Canadian Centre for Climate Change and Adaptation**

# Description

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UPEI has land available in the St. Peters area of rural PEI to house the new facility. Land specifications, site map, and aerial images are included in the business cases.

### **Project Timeline**

It is estimated that construction would commence upon approval of funding in the Summer of 2019 and

ATIA - 20(1)(b)
ATIA - 20(1)(c)
ATIA - 20(1)(d)

be completed for use by September 2020.

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# Financial **Proposed Project Costs and Financing** Land and site improvement costs are estimated at and will consist of activities required to prepare the land for the Centre's construction, including earthwork, landscaping, and paving. In keeping with climate action priorities, it is proposed that the new Centre and student residence be constructed and operated in a sustainable manner, meeting or exceeding the energy efficiency requirements of the Model National Energy Code for Buildings. The construction budget estimate is per square foot for the Centre and per square foot for the student residence, exclusive of specialized technology and equipment. On this basis, the capital costs for the construction of the buildings are estimated to be Through extensive consultation with faculty and industry experts, UPEI has identified the technologies and equipment required for the Canadian Centre for Climate Change and Adaptation and Research Centres of Excellence. Specialized equipment and leading-edge technology are estimated to be Examples of technologies and equipment include small, unmanned air vehicles (sUAVs), aerial senor packages, real-time kinetic global positioning systems, field monitoring kits and supplies, research boat, trailer, backup generator and state-of-the-art communications infrastructure, computer equipment, networks, servers, and security systems for data storage and management in rural PEI.

# **Estimated Capital Costs for the project**

School (a) See the Section of the Art Control of the Section (Section 1) the S

# **Proposed Capital Financing**

Infrastructure Canada \$ 10,000,000 University of Prince Edward Island 4,300,000 Atlantic Canada Opportunities Agency 4,000,000 TOTAL \$ 18,300,000

# **Key Considerations**

- Under NBCF-PTIC-NRP, the maximum federal cost-sharing and stacking limit for UPEI is up to one-third (33.33 percent) of the total eligible costs of a project.
- Based on the information currently submitted to, the total eligible costs for the project would be: \$11,000,000 and the total federal share cap is 33.3 per cent under NBCF-NRP.
- The combined federal contribution requested from the two federal departments (ACOA \$4M and INFC \$10M) would represent more than 100 percent of the eligible costs of the project which is well above the program stacking limit.

•	
*	Also, based on a preliminary review of the project costs, some of the costs - listed in the business case (highlighted above) would not be eligible expenses under the program as they are not
	fixed assets and the program doesn't pay for equipment. In addition, the residence - and the purchase of land - won't be eligible according to the

From:

La Rue, Jean-François (INFC)

Sent:

February 12, 2019 4:52 PM

To:

Fortin3, Marc (INFC)

Cc:

Loginova, Natasha (INFC); Chung-How, Catherine (INFC); Monica Alejandra Sierra (INFC)

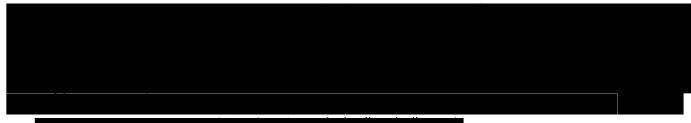
(monicaalejandra.sierra@canada.ca)

Subject:

Salut,

Pour ton info, le projet the UPEI

Je t'ai donnée l'info demandé concernant le statut du projet plus tôt ce PM



- ACOA me dit que UPEI a un nouveau montage financier, mais selon ACOA, notre montant demandé est toujours supérieur à ce que nous pouvons offrir
  - o INFC n'a pas reçu ni eu vent de cette nouvelle proposition.
  - Nous allons essayer de l'avoir

# Question:

- 1. Est-ce que nous voulons aller là?
- 2. Est-ce que la décision est prise par notre MINO et notre DM?

From:

La Rue, Jean-François (INFC)

Sent:

February 13, 2019 7:58 AM

To:

Fortin3, Marc (INFC)

Cc:

Chung-How, Catherine (INFC)

Subject:

UPEI // Follow Up

Il semble que la demande n'origine pas de PMO...

----Original Message-----

From: Haidon, Shelly [mailto:Shelly.Haidon@pco-bcp.gc.ca]

Sent: February 12, 2019 5:29 PM

To: Williams, Tushara (INFC) <tushara.williams@canada.ca>

Cc: La Rue, Jean-François (INFC) <jean-francois.larue@canada.ca>

Subject: Re: Follow Up

This is not from PMO

Sent from my iPhone

On Feb 12, 2019, at 4:48 PM, Williams, Tushara (INFC) <a href="mailto:tushara.williams@canada.ca">tushara.williams@canada.ca</a> wrote:

Shelly

I checked in with the program DG responsible for Atlantic projects – cc'd above. We are aware of the NBCF project (UPEI – Canada Centre for Climate Change & Adaptation).

Thanks in advance Tushara

Tushara Williams

Director General / Directrice générale

Strategic and Sectoral Policy / Politiques stratégiques et sectorielles Infrastructure Canada

180 Kent St. Ottawa, ON K1P 0B6 / 180 rue Kent, Ottawa K1P 0B6

tushara.williams@canada.ca<mailto:tushara.williams@canada.ca>

Telephone / Téléphone: 613-957-4337

From:

La Rue, Jean-François (INFC)

Sent:

February 13, 2019 11:42 AM

To:

Fortin3, Marc (INFC); Williams, Tushara (INFC)

Cc:

Chung-How, Catherine (INFC); Loginova, Natasha (INFC)

Subject:

FW: Climate Change UPEI = update

# Few more info

ACOA just shared with us the revised proposal they received.

INFC did not get it.....yet by UPEI or the Province

INFC tried to reach out to the Province this AM —

 INFC-POB will review the proposal and see if it changes the picture, but according to the numbers on page 13, we are still over the 33.3%;

### Table 2: Sources of Funding

- Infrastructure Canada Non-repayable capital contribution \$ 7,300,000
- Atlantic Canada Opportunities Agency Non-repayable capital contribution 3,700,000
- Province of Prince Edward Island Non-repayable capital contribution 3,000,000
- UPEI Fundraising and Donations 4,300,000
- Total Proposed Project Financing \$ 18,300,000

From: Lambe, Sandra (ACOA/APECA) Sent: February 13, 2019 10:48 AM

To: Chung-How, Catherine (INFC) < catherine.chung-how@canada.ca> Cc: La Rue, Jean-François (INFC) < jean-francois.larue@canada.ca>

Subject: FW: Climate Change UPEI

Hi Catherine. I just received a copy of the revised proposal which will be submitted to Infrastructure. The UPEI folks sent it to us as an FYI. I don't know what route it is taking to get to you so thought I would share what we received to give you a heads-up.

I don't want to interject in any way between INFC and the Province – but don't hesitate to contact me if ACOA can provide any assistance in getting you information you require. UPEI is good to keep us in the loop.

### Sandra Lambe

Director General Regional Operations
Atlantic Canada Opportunities Agency, Prince Edward Island | Government of Canada <a href="mailto:sandra.lambe@canada.ca">sandra.lambe@canada.ca</a> / Tel: 902-566-7033 / TTY: 1-877-456-6500

Directrice genéralé, Opérations régionales

Agence de promotion économique du Canada atlantique, Île-du-Prince-Édouard | Gouvernement du Canada sandra.lambe@canada.ca / Tel: 902-566-7033 / ATS: 1-877-456-6500

# Scharf, Kelsey (INFC)

From:

Scharf, Kelsey (INFC)

Sent:

March 19, 2019 1:40 PM

To:

Syed, Fariya (INFC); Chung-How, Catherine (INFC); Villeneuve, Elizabeth (INFC)

Subject:

Some background info on UPEI







PEI - Strategic brief -UPEI (0... Climate Adaptat...

DM Call - UPEI

SN-UPEI (003).doc

-----Original Appointment-----

From: Sierra, Monica Alejandra (INFC) On Behalf Of La Rue, Jean-François (INFC)

**Sent:** March 19, 2019 12:47 PM

To: Syed, Fariya (INFC); Chung-How, Catherine (INFC); Villeneuve, Elizabeth (INFC); Scharf, Kelsey (INFC)

**Subject:** UPEI Discussion

When: March 19, 2019 4:00 PM-4:30 PM (UTC-05:00) Eastern Time (US & Canada).

Where: JF's office



### SCENARIO NOTE TO THE DEPUTY MINISTER

# DEPUTY MINISTER CALL TO DISCUSS OF UNIVERSITY OF PRINCE EDWARD ISLAND CANADIAN CENTRE FOR CLIMATE CHANGE AND ADAPTATION PROJECT

### **MEETING DETAILS**

- DATE/TIME: Monday, August 13, 2018 3:30 p.m.
- LOCATION: Teleconference
- PARTICIPANTS:
  - Infrastructure Canada :
    - Kelly Gillis, Deputy Minister of Infrastructure and Communities
    - Fariya Syed, Director, Program Operations, North/Atlantic Region
    - Catherine Chung-How, Manager, Program Operations, North/Atlantic Region
  - o Other Departments:
    - Stephen Lucas, Deputy Minister, Environment and Climate Change Canada
    - Francis McGuire, President, Atlantic Canada Opportunities Agency
    - Chris Forbes, Deputy Minister, Agriculture and Agri-Food Canada

# **ISSUE**

 Follow-up call to discuss a proposal submitted by the University of Prince Edward Island (UPEI), which involves the construction of a new facility called the Canadian Centre for Climate Change and Adaptation (the Project) that will house a new academic program.

### HIGHLIGHTS/KEY CONSIDERATIONS

- The Province of Prince Edward Island (PEI) prioritized the Project under the New Building Canada Fund-Provincial-Territorial Infrastructure Component-National and Regional Projects (NBCF-PTIC-NRP) prior to the March 31, 2018, deadline.
- The Province submitted the business case for the Project in June 2018 under the Innovation subcategory of NBCF-PTIC-NRP. UPEI is requesting funding of up to \$15,000,000 which represents approximately 50 percent of the total costs of the Project.
- In addition, UPEI has also requested funding from two other federal departments: Environment and Climate Change Canada (ECCC) and Atlantic Canada Opportunities Agency (ACOA) which is a stacking issue.

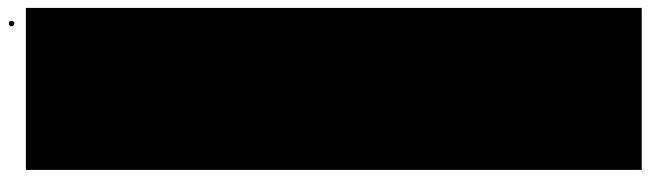
Sources of Funding	Amount
Infrastructure Canada: New Building Canada	
Fund	
Environment and Climate Change Canada	
Atlantic Canada Opportunities Agency	
Proponent (University of Prince Edward	
Island)	
Total Project Costs	

Under NBCF-PTIC-

**PROTECTED B** 

NRP, the maximum federal cost-sharing and stacking limit for UPEI is up to one-third (33.33 percent) of the total eligible costs of a project. The recipient is requesting approximately 50 percent which is above the cost-sharing limit.

- Also, based on a preliminary review of the project costs, some of the costs listed in the
  business case would not be eligible expenses under the program, as they are not fixed
  assets (e.g., research boat, trailer, air vehicles etc.).
- Finally, INFC had previously explored the possibility of funding the Project under the Investing in Canada Infrastructure Program (ICIP) with the Province. The Project would not be eligible under the ICIP.



During the call, ACOA indicated that it had not made a firm commitment to UPEI for the \$5 million at this point and had not yet received an application for the Project.

ACOA has only just recently received an application from the proponent and is currently reviewing the application.

• At the end of the call, Deputy Ministers agreed to touch base again in advance of Minister Champagne's visit to PEI.

### KEY BACKGROUND

 The Project will build capacity for evidence-based decision making needed to inform policy, advance research, and accelerate innovation to enable Canada's effective transition to a clean growth economy.

PROTECTED B

- The project involves the construction of a new facility at a site in St. Peters, PEI and will include four Research Centres of Excellence, multipurpose space, innovation collaboration space, student residence, storage, repair shop, greenhouses and common areas at UPEI.
- The Project is located outside of campus, but on UPEI land. This location provides an
  advantage to researchers, students, and partners with its close proximity to protected land
  and unique ecosystems within Parks Canada's National Park at Greenwich. The
  construction will allow for innovation in teaching, research, and experiential learning at the
  University.

## Points to register

- Minister Champagne and I will be in PEI later this week.
- As mentioned during the last call, based on a preliminary review of the information provided in the business case, the Project would appear to be eligible under the Innovation subcategory of the New Building Canada Fund-Provincial-Territorial Infrastructure Component-National and regional Projects (NBCF-PTIC-NRP). My officials are reviewing the business case more closely to assess eligibility.



• I also understand that Atlantic Canada Opportunities Agency (ACOA) recently received an application from the proponent and is currently reviewing the application.

Attachment:

Annex A - Synopsis of project

ATIA - 14 ATIA - 21(1)(a)
ATIA - 20(1)(c) ATIA - 21(1)(b)
ATIA - 20(1)(d)

### **UPEI**

A proposal was submitted by the University of Prince Edward Island (UPEI), which involves the construction of a new facility called the Canadian Centre for Climate Change and Adaptation (the Project) that will house a new academic program. The Project will build capacity for evidence-based decision making needed to inform policy, advance research, and accelerate innovation to enable Canada's effective transition to a clean growth economy.

The Project will involve building a new facility to house the academic program. The Project will include four Research Centres of Excellence, multipurpose space, innovation collaboration space, student residence, storage, repair shop, greenhouses and common areas at UPEI.

### Context

**UPEI submitted a business case under the Innovation subcategory of NBCF-PTIC-NRP**. The Province of Prince Edward Island (PEI) prioritized the Project under the New Building Canada Fund-Provincial-Territorial Infrastructure Component-National and Regional Projects (NBCF-PTIC-NRP) prior to the March 31, 2018, deadline. The business case was submitted in June 2018.

**UPEI** is requesting funding from INFC for 50 percent of total project costs. The recipient is requesting approximately 50 percent which is above the cost-sharing limit. Under NBCF-PTIC-NRP, the maximum federal cost-sharing and stacking limit for UPEI is up to one-third (33.33 percent) of the total eligible costs of a project.

**UPEI** is also requesting funding from other federal departments. In addition to the funding being requested from Infrastructure Canada (INFC), UPEI has requested funding from two other federal departments: Environment and Climate Change Canada (ECCC) and Atlantic Canada Opportunities Agency (ACOA) which is a stacking issue.

Sources of Funding	Amount
Infrastructure Canada: New Building Canada Fund	
Environment and Climate Change Canada	
Atlantic Canada Opportunities Agency	
Proponent (University of Prince Edward Island)	
Total Project Costs	

**No firm commitment from ECCC and ACOA.** Based on INFC discussions with ECCC officials is that ECCC doesn't have a funding mechanism to support for the Project. As for ACOA, it has not made a firm commitment to UPEI for the \$5 million at this point but the Agency is interested in the Project.

# **Risks and Mitigations**

NBCF-PTIC-NRP, the maximum federal cost-sharing and stacking limit for UPEI is up to one-third (33.33 percent) of the total eligible costs of a project. The recipient is requesting approximately 50 percent which is above the cost-sharing limit.

Many costs outlined in the business case would be ineligible. Also, based on a preliminary review of the project costs, some of the costs listed in the business case would not be eligible expenses under the program, as they are not fixed assets (e.g., research boat, trailer, air vehicles etc.).

# Next Steps

Based on a preliminary review of the information provided in the business case, the Project
would appear to be eligible under the Innovation subcategory of the New Building Canada
Fund-Provincial-Territorial Infrastructure Component-National and regional Projects (NBCFPTIC-NRP). INFC will be reviewing the business case more closely to assess eligibility.

August 15, 2018: Minister meeting with Mayor of Charlottetown

# **UPEI - Canadian Centre for Climate Change and Adaptation**

**UPEI -** Canadian Centre for Climate Change and Adaptation

# Description

**UPEI is** proposing to establish the Canadian Centre for Climate Change and Adaptation under the innovation category of NBCF-NRP. The Centre will be housed within a new 35,000 square foot facility which will be constructed at a site in St. Peters, Prince Edward Island and will include **four Research Centres of Excellence**, multipurpose space, innovation collaboration space, storage, repair shop, greenhouses and common areas. **A new 17,500 square foot student residence** will be constructed on the same site.

The four Research Centres of Excellence to support the creation of new climate change knowledge, adaptation, and innovation needed to accelerate Canada's transition to a clean growth economy.

Within the Centre, UPEI will lead four research centres of excellence in:

- Data and Policy Analysis for Transition to Low-Carbon Economies,
- Coastal Systems Impacts,
- Clean Technology Innovation in Support of Agriculture and Aquaculture, and
- Climate Change and Human Health.

The Centre will enable the promotion of the productivity and health of Canadian communities over the long-term. The proposed Canadian Centre for Climate Change and Adaptation will mobilize new knowledge and expertise that is applied locally and adapted at national and global levels. The enhanced direction and focus on climate change for UPEI, as outlined in this document, exemplifies the four pillars of the University that build on core strengths: Student Experience, Vibrant Communities, Exploration and Discovery, and Long-term Sustainability.

Centres of Research Excellence in Climate Change and Adaptation will be housed within the Canadian Centre for Climate Change and Adaptation hosted by UPEI and located in St. Peter's, PEI. Researchers, students, and partners will have ready access to the internationally-recognized UPEI Climate Research Lab, as well as access to outstanding global climate partner networks, and researchers in diverse areas of climate and climate-related areas of expertise being developed through new higher learning and research programs.

The Centre's location provides an advantage to researchers and students with its close proximity to protected land and unique ecosystems within Parks Canada's National Park at Greenwich. Its location in Eastern PEI further supports the University's strategy to develop transformative and immersive climate change programs 'in the field' with strong collaboration and community outreach.

ATIA - 20(1)(b) ATIA - 20(1)(c) ATIA - 20(1)(d)

The proposed Canadian Centre for Climate Change and Adaptation UPEI's Department of Science and School of Graduate Studies will deliver highly innovative and relevant programming a Bachelor of Science in Applied Climate Change and Adaptation and a Master of Science in Climate Change and Adaptation.

### Land

UPEI has land available in the St. Peters area of rural PEI to house the new facility. Land specifications, site map, and aerial images are included in the business cases.

# **Project Timeline**

It is estimated that construction would commence upon approval of funding in the Summer of 2019 and be completed for use by September 2020.

# Recipient

The Canadian Center for Climate Change and Adaptation will be established, operated, and maintained by the University of Prince Edward Island. The University of Prince Edward Island is governed by a Board of Governors and a Senate, instituted under the terms of the Prince Edward Island government's University Act.

### **Financial**

# **Proposed Project Costs and Financing**

Land and site improvement costs are estimated at an and will consist of activities required to prepare the land for the Centre's construction, including earthwork, landscaping, and paving.

In keeping with climate action priorities, it is proposed that the new Centre and student residence be constructed and operated in a sustainable manner, meeting or exceeding the energy efficiency requirements of the Model National Energy Code for Buildings.

The construction budget estimate is per square foot for the Centre and per square foot for the student residence, exclusive of specialized technology and equipment. On this basis, the capital costs for the construction of the buildings are estimated to be

Through extensive consultation with faculty and industry experts, UPEI has identified the technologies and equipment required for the Canadian Centre for Climate Change and Adaptation and Research Centres of Excellence. Specialized equipment and leading-edge technology are estimated to be Examples of technologies and equipment include small, unmanned air vehicles (SUAVs), aerial senor packages, real-

time kinetic global positioning systems, field monitoring kits and supplies, research boat, trailer, backup generator and state-of-the-art communications infrastructure, computer equipment, networks, servers, and security systems for data storage and management in rural PEI.

# **Estimated Capital Costs for the project**



# **Proposed Capital Financing**

Infrastructure Canada \$ 10,000,000 University of Prince Edward Island 4,300,000 Atlantic Canada Opportunities Agency 4,000,000 TOTAL \$ 18,300,000

# **Key Considerations**

- Under NBCF-PTIC-NRP, the maximum federal cost-sharing and stacking limit for UPEI is up to one-third (33.33 percent) of the total eligible costs of a project.
- Based on the information currently submitted to, the total eligible costs for the project would be: \$11,000,000 and the total federal share cap is 33.3 per cent under NBCF-NRP.
- The combined federal contribution requested from the two federal departments (ACOA - \$4M and INFC \$10M) would represent more than 100 percent of the eligible costs of the project which is well above the program stacking limit.

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•	Also, based on a preliminary review of the project costs, some of the costs -	
	listed in the business case (highlighted above) would not be eligible	
	expenses under the program as they are not fixed assets and the program doesn't	t
	pay for equipment. In addition, the residence - and the purchase of lar	٦d
	won't be eligible according to the TS and Cs.	



### **SECURITY DESIGNATION**

### SCENARIO NOTE TO THE DEPUTY MINISTER

# MEETING BETWEEN DEPUTY MINISTER OF INFRASTRUCTURE AND COMMUNITIES AND DM OF ATLANTIC CANADA OPPORTUNITIES AGENCY

# **MEETING DETAILS**

- **DATE/TIME**: Friday, July 27, 2018, 1:30 p.m.
- LOCATION: Teleconference
- PARTICIPANTS:
  - o Infrastructure Canada:
    - Kelly Gillis, Deputy Minister of Infrastructure and Communities
    - Eric Landry, Director General Program Operations, North/Atlantic/Ontario
  - o Other Departments:
    - Stephen Lucas, DM, ECCC
    - Francis MacGuire, President, ACOA
    - Chris Forbes, DM, AAFC

# <u>ISSUE</u>

To discuss a proposal submitted by the University of Prince Edward Island (UPEI), which
involves the construction of a new facility called the Canadian Centre for Climate Change
and Adaptation that will house a new academic program.

### **HIGHLIGHTS/KEY CONSIDERATIONS**

 The business case was submitted under the Innovation subcategory of NBCF-PTIC-NRP. UPEI is asking for funding of \$15,000,000 which represents 50% of the total costs of the Project.

- In addition, UPEI has also requested funding from 2 other federal departments:
  - o Environment and Climate Change Canada
  - Atlantic Canada Opportunities Agency which is a stacking issue.

•	The maximum federal contribution from all sources can only be up to one-third (33.33%) of
	the total eligible costs of a project,

### **SECURITY DESIGNATION**

Sources of Funding	Amount
Infrastructure Canada: New Building Canada	
Fund	
Environment and Climate Change Canada	
Atlantic Canada Opportunities Agency	
Proponent (University of Prince Edward	
Island)	
Total Project Costs	

 Many costs listed in the business case would not be eligible expenses under the program, as they are not fixed assets (ex. Research boat, trailer, air vehicles etc.).

### **KEY BACKGROUND**

- The Canadian Centre for Climate Change and Adaptation project (the project) hosted by the University of Prince Edward Island (UPEI) will build capacity for evidence-based decision making needed to inform policy, advance research, and accelerate innovation to enable Canada's effective transition to a clean growth economy.
- The project involves the construction of a new facility at a site in St. Peters, PEI and will include four Research Centres of Excellence, multipurpose space, innovation collaboration space, student residence, storage, repair shop, greenhouses and common areas at UPEI.
- The Project is located outside of campus, but on UPEI land. This location provides an
  advantage to researchers, students, and partners with its close proximity to protected land
  and unique ecosystems within Parks Canada's National Park at Greenwich. The
  construction will allow for innovation in teaching, research, and experiential learning at the
  University.

# Points to register

 Based on the information provided in the business case, the Project could potentially be eligible under the Innovation subcategory.

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Attachment:

Annex A – Synopsis of project

ANNEX A

# Synopsis of Project

The University of Prince Edward Island (UPEI) has submitted a business case for the construction of a new 36,000 square foot facility called the Canadian Centre for Climate Change and Adaptation at a site in St. Peters, PEI and will include four Research Centres of Excellence, multipurpose space, innovation collaboration space, student residence, storage, repair shop, greenhouses and common areas.

The four research Centre's of excellence within the Centre include:

- Data and Policy Analysis for Transition to Low-Carbon Economies
- Coastal Systems Impacts
- Clean Technology Innovation in Support of Agriculture and Aquaculture
- Climate Change and Human Health

The Project will be housed at a UPEI satellite campus to be located in St. Peters PEI. This location provides an advantage to researchers, students, and partners with its close proximity to protected land and unique ecosystems within Parks Canada's National Park at Greenwich.

Within the Canadian Centre for Climate Change and Adaptation, UPEI will deliver higher learning programs focused on developing much needed climate change professionals, researchers, and decision makers for the future, through UPEI's recently approved Bachelor of Science in Applied Climate Change and Adaptation, as well as a Masters in Climate Change and Adaptation that is in development. This program will serve as the academic foundation upon which new research, teaching and academic programming contributing to leadership and innovation in public policy thinking will take place.

Graduates of the program will have relevant knowledge and skills to compete for a diverse range of career opportunities related to science, social, and policy aspects of climate change in areas ranging from entrepreneur-based businesses to all levels of government. The program will also provide graduates with entry level requirements needed for many professional and graduate programs in related fields, including areas such as climate related science programs, meteorology, policy, law, public administration, data analytics, and more.

The Proponent is an eligible recipient (a public institution delivering post-secondary courses or programs that lead to recognize and transferable post-secondary credentials) under the Provincial-Territorial Infrastructure Component – National and Regional Projects (PTIC-NRP).

The Project is eligible under the Innovation category, specifically the subcategories:

- Post-secondary research and development laboratories and Centre's, and related teaching facilities; and
- Office space for the purpose of conducting research and development.

Construction to begin Summer 2018, and finish in 2022.

# Scharf, Kelsey (INFC)

From:

Chung-How, Catherine (INFC)

Sent:

March 19, 2019 1:55 PM

To:

Scharf, Kelsey (INFC); Villeneuve, Elizabeth (INFC)

Cc:

Syed, Fariya (INFC)

Subject:

REVISED: Some background info on UPEI

Hi all,

Here is the new revised one-pager that was given to Marc in January.



### **Catherine Chung How**

Manager, North/Atlantic/Ontario Directorate Program Operations Branch Infrastructure Canada / Government of Canada catherine.chung-how@canada.ca / Tel: 613-960-2513

Gestionnaire, Direction régionale du Nord/Atlantique/Ontario Opérations des programmes Infrastructure Canada / Gouvernement du Canada catherine.chung-how@canada.ca: Tél: 613-960-2513

From: Chung-How, Catherine (INFC) Sent: March 19, 2019 1:52 PM

To: Scharf, Kelsey (INFC) <kelsey.scharf@canada.ca>; Syed, Fariya (INFC) <fariya.syed@canada.ca>; Villeneuve, Elizabeth

(INFC) <elizabeth.villeneuve@canada.ca> **Subject:** RE: Some background info on UPEI

Thank you Kelsey. I think they submittes a revised business case since then

### **Catherine Chung How**

Manager, North/Atlantic/Ontario Directorate Program Operations Branch Infrastructure Canada / Government of Canada catherine.chung-how@canada.ca / Tel: 613-960-2513

Gestionnaire, Direction régionale du Nord/Atlantique/Ontario Opérations des programmes Infrastructure Canada / Gouvernement du Canada <a href="mailto:catherine.chung-how@canada.ca">catherine.chung-how@canada.ca</a>: Tél: 613-960-2513

From: Scharf, Kelsey (INFC) Sent: March 19, 2019 1:40 PM

To: Syed, Fariya (INFC) <fariya.syed@canada.ca>; Chung-How, Catherine (INFC) <catherine.chung-how@canada.ca>;

Villeneuve, Elizabeth (INFC) <elizabeth.villeneuve@canada.ca>

Subject: Some background info on UPEI

<< File: PEI - Strategic brief -UPEI (002).DOCX >> << File: DM Call - UPEI Climate Adaptation Centre August 12 2018-

SN.doc >> << File: SN-UPEI (003).doc >>

----Original Appointment----

From: Sierra, Monica Alejandra (INFC) On Behalf Of La Rue, Jean-François (INFC)

Sent: March 19, 2019 12:47 PM

To: Syed, Fariya (INFC); Chung-How, Catherine (INFC); Villeneuve, Elizabeth (INFC); Scharf, Kelsey (INFC)

Subject: UPEI Discussion

When: March 19, 2019 4:00 PM-4:30 PM (UTC-05:00) Eastern Time (US & Canada).

Where: JF's office

# **UPEI - Canadian Centre for Climate Change and Adaptation**

**UPEI** - Canadian Centre for Climate Change and Adaptation

# **Description**

**UPEI is** proposing to establish the Canadian Centre for Climate Change and Adaptation under the innovation category of NBCF-NRP. The Centre will be housed within a new 35,000 square foot facility which will be constructed at a site in St. Peters, Prince Edward Island and will include **four Research Centres of Excellence**, multipurpose space, innovation collaboration space, storage, repair shop, greenhouses and common areas. **A new 17,500 square foot student residence** will be constructed on the same site.

The four Research Centres of Excellence to support the creation of new climate change knowledge, adaptation, and innovation needed to accelerate Canada's transition to a clean growth economy.

Within the Centre, UPEI will lead four research centres of excellence in:

- Data and Policy Analysis for Transition to Low-Carbon Economies,
- Coastal Systems Impacts,
- Clean Technology Innovation in Support of Agriculture and Aquaculture, and
- Climate Change and Human Health.

The Centre will enable the promotion of the productivity and health of Canadian communities over the long-term. The proposed Canadian Centre for Climate Change and Adaptation will mobilize new knowledge and expertise that is applied locally and adapted at national and global levels. The enhanced direction and focus on climate change for UPEI, as outlined in this document, exemplifies the four pillars of the University that build on core strengths: Student Experience, Vibrant Communities, Exploration and Discovery, and Long-term Sustainability.

Centres of Research Excellence in Climate Change and Adaptation will be housed within the Canadian Centre for Climate Change and Adaptation hosted by UPEI and located in St. Peter's, PEI. Researchers, students, and partners will have ready access to the internationally-recognized UPEI Climate Research Lab, as well as access to outstanding global climate partner networks, and researchers in diverse areas of climate and climate-related areas of expertise being developed through new higher learning and research programs.

The Centre's location provides an advantage to researchers and students with its close proximity to protected land and unique ecosystems within Parks Canada's National Park at Greenwich. Its location in Eastern PEI further supports the University's strategy to develop transformative and immersive climate change programs 'in the field' with strong collaboration and community outreach.

ATIA - 20(1)(b)
ATIA - 20(1)(c)
ATIA - 20(1)(d)

The proposed Canadian Centre for Climate Change and Adaptation UPEI's Department of Science and School of Graduate Studies will deliver highly innovative and relevant programming a Bachelor of Science in Applied Climate Change and Adaptation and a Master of Science in Climate Change and Adaptation.

# Land

UPEI has land available in the St. Peters area of rural PEI to house the new facility. Land specifications, site map, and aerial images are included in the business cases.

# **Project Timeline**

It is estimated that construction would commence upon approval of funding in the Summer of 2019 and be completed for use by September 2020.

# Recipient

The Canadian Center for Climate Change and Adaptation will be established, operated, and maintained by the University of Prince Edward Island. The University of Prince Edward Island is governed by a Board of Governors and a Senate, instituted under the terms of the Prince Edward Island government's University Act.

### **Financial**

# **Proposed Project Costs and Financing**

Land and site improvement costs are estimated at an and will consist of activities required to prepare the land for the Centre's construction, including earthwork, landscaping, and paving.

In keeping with climate action priorities, it is proposed that the new Centre and student residence be constructed and operated in a sustainable manner, meeting or exceeding the energy efficiency requirements of the Model National Energy Code for Buildings.

The construction budget estimate is per square foot for the Centre and per square foot for the student residence, exclusive of specialized technology and equipment. On this basis, the capital costs for the construction of the buildings are estimated to be

Through extensive consultation with faculty and industry experts, UPEI has identified the technologies and equipment required for the Canadian Centre for Climate Change and Adaptation and Research Centres of Excellence. Specialized equipment and leading-edge technology are estimated to be Examples of technologies and equipment include small, unmanned air vehicles (SUAVs), aerial senor packages, real-

ATIA - 20(1)(b)
ATIA - 20(1)(c)

ATIA - 20(1)(d)
ATIA - 69(1)(g) - (a)

time kinetic global positioning systems, field monitoring kits and supplies, research boat, trailer, backup generator and state-of-the-art communications infrastructure, computer equipment, networks, servers, and security systems for data storage and management in rural PEI.

# **Estimated Capital Costs for the project**



# **Proposed Capital Financing**

Infrastructure Canada \$ 10,000,000 University of Prince Edward Island 4,300,000 Atlantic Canada Opportunities Agency 4,000,000 TOTAL \$ 18,300,000

# **Key Considerations**

- Under NBCF-PTIC-NRP, the maximum federal cost-sharing and stacking limit for UPEI is up to one-third (33.33 percent) of the total eligible costs of a project.
- Based on the information currently submitted to, the total eligible costs for the project would be: \$11,000,000 and the total federal share cap is 33.3 per cent under NBCF-NRP.
- The combined federal contribution requested from the two federal departments (ACOA - \$4M and INFC \$10M) would represent more than 100 percent of the eligible costs of the project which is well above the program stacking limit.

•	

0	Also, based on a preliminary review of the project costs, some of the costs -
	listed in the business case (highlighted above) would not be eligible
	expenses under the program as they are not fixed assets and the program doesn't
	pay for equipment. In addition, the residence - and the purchase of land
	won't be eligible according to the TS and Cs.

# Scharf, Kelsey (INFC)

From:

Sent: To:	March 19, 2019 3:45 PM Scharf, Kelsey (INFC)
Cc:	Chung-How, Catherine (INFC)
Subject:	FW: (1 of 3) PEI - PTIC NRP Project Update - PIMS 52336 - Canadian Centre for Climate
,	Change and Adaptation
Attachments:	Business Case for Canadian Centre for Climate Change and Ad_Part1.pdf; Business Case for Canadian Centre for Climate Change and Ad_Part2.pdf; Business Case for Canadian Centre for Climate Change and Ad_Part3.pdf
As discussed – see three p	arts attached.
From: Alex Dalziel [mailto: Sent: January 31, 2019 3:4	
	INFC) <elizabeth.villeneuve@canada.ca></elizabeth.villeneuve@canada.ca>
Cc: Paul Godfrey <jpgodf< th=""><th>REY@gov.pe.ca&gt;</th></jpgodf<>	REY@gov.pe.ca>
Subject: (1 of 3) PEI - PTIC	NRP Project Update - PIMS 52336 - Canadian Centre for Climate Change and Adaptation
was originally submitted in me know you've received a To echo the accompanying will bring to the educations	lated business case for the Canadian Centre for Climate Change and Adaptation project, which June of 2018. Due to file size restrictions I am sending it in 3 separate emails. If you could let all three that would be great.  If you could let all three that would be great.  If you could let all three that would be great.  If you could let all three that would be great.  If you could let all three that would be great.  If you could let all three that would be great.
Thanks,	
Alex	
Statement of Confidentialit	ty
individual or organization. are not the intended recipi	tachments) may contain confidential or privileged information intended for a specific If you have received this communication in error, please notify the sender immediately. If you lent, you are not authorized to use, disclose, distribute, copy, print or rely on this email, and semail from your entire computer system.

Villeneuve, Elizabeth (INFC)

Déclaration de confidentialité

# BUSINESS CASE FOR FUNDING FOR CANADIAN CENTRE FOR CLIMATE CHANGE AND ADAPTATION UNDER THE NEW BUILDING CANADA FUND: PROVINCIAL-TERRITORIAL INFRASTRUCTURE COMPONENT, NATIONAL/REGIONAL PROJECTS

SUBMITTED UNDER INNOVATION SUBCATEGORY

Project Update to January 31, 2019 for Revised Capital
Costs and Proposed Financing

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# 1.0 Project Description

#### 1.1 Project Name and Category

A proposal of the project "Canadian Centre for Climate Change and Adaptation" is being submitted under the Innovation subcategory of the New Build Canada Fund Provincial-Territorial Infrastructure Component, National/Regional Projects.

### 1.2 Project Design

The Canadian Centre for Climate Change and Adaptation hosted by the University of Prince Edward Island (UPEI) will work collaboratively to build capacity for evidence-based decision making needed to inform policy, advance research, and accelerate innovation to enable Canada's effective transition to a clean growth economy.

The Canadian Centre for Climate Change and Adaptation is built on a model of strong research and higher learning, hallmarked by purposeful collaboration with communities, industry, and governments.

Within the Centre, UPEI will lead four research centres of excellence in:

- Data and Policy Analysis for Transition to Low-Carbon Economies,
- Coastal Systems Impacts,
- Clean Technology Innovation in Support of Agriculture and Aquaculture, and
- Climate Change and Human Health.

Together, the research centres will form a cluster of discovery and new knowledge acquisition within the Canadian Centre for Climate Change and Adaptation. By leveraging existing strengths of the UPEI Climate Research Lab (a globally recognized climate research centre that has drawn the praise of research intensive institutions such as MIT and Stanford University), the climate change and adaptation knowledge cluster will be further developed through strong networks and timely partnerships to ensure the application of new knowledge and innovation within our communities.

Within the Canadian Centre for Climate Change and Adaptation, UPEI will deliver higher learning programs focused on developing much needed climate change professionals, researchers, and decision makers of the future, through UPEI's recently approved Bachelor of Science in Applied Climate Change and Adaptation, as well as a Master in Climate Change and Adaptation that is in development.

The Canadian Centre for Climate Change and Adaptation's commitment to scientific discovery, application, and new climate change knowledge will provide Canada with the capacity to deliver climate change solutions needed to advance Canada's clean growth economy for the prosperity and well being of all our citizens. A more detailed project description is contained in Appendix G Canadian Centre for Climate Change and Adaptation Business Plan (original business plan, dated September 2017).

The Centre will be housed within a new 35,000 square foot facility which will be constructed at a site in St. Peters, Prince Edward Island and will include four Research Centres of Excellence, multipurpose space, innovation collaboration space, storage, repair shop, greenhouses and common areas. A new 17,500 square foot student residence will be constructed on the same site.



Common area space within the Centre will be designed to encourage faculty, researchers, students, and partners to interact, fuelling innovation and integration of research focus areas.

In keeping with climate action priorities, it is proposed that the new facilities be constructed and operated in a sustainable manner. The buildings' high efficient design features will include renewable energy sources such as wind and solar, geothermal heating and a green roof.

A Class D concept budget prepared by Brighton Construction Inc. can be found in Appendix E.

#### 1.3 Land

UPEI has land available in the St. Peters area of rural PEI to house the new facility. Land specifications, site map, and aerial images can be found in Appendix A.

## 1.4 Project Timeline

It is estimated that construction would commence upon approval of funding in the Summer of 2019 and be completed for use by September 2020.



# 2.0 Alignment with Innovation Subcategory

#### 2.1 Vision and Strategic Priorities

The Canadian Centre for Climate Change and Adaptation will be a leader in climate change adaptation and resilience by building capacity for evidence-based decisions that are needed to inform policy, advance research, and accelerate innovation for the prosperity and well -being of all citizens.

The strategic priorities of the Canadian Centre for Climate Change and Adaptation include:

- to provide government and industry with next generation professionals and researchers who have
  the skills and experiences that are required to help communities remain sustainable in the face of
  climate change (from the perspectives of economic, well-being/health, and culture);
- to deliver truly unique experiential learning and discovery opportunities for students, faculty, and visiting researchers who will have a direct impact on community, industry, and public policy; and
- to work with businesses, industry, communities, and government to determine the solutions to climate
- change challenges that will inform public policy in a manner that supports sustainable communities, adaptable sectors, and entrepreneurial developments, enabling transition to a clean growth economy.

The Research Centres of Excellence within the Canadian Centre for Climate Change and Adaptation will build capacity in four core areas:

**Data and Policy Analysis for Transition to Low-Carbon Economies** 

**Coastal Systems Impacts** 

Clean Technology Innovation in Support of Agriculture and Aquaculture

**Climate Change and Human Health** 

The Research Centres of Excellence will leverage UPEI's **proven track record** in mobilizing new knowledge in climate change, working with local, national, and international communities, as well as **interdisciplinary research** through collaboration with existing and complementary expertise at UPEI, and climate change networks around the world.

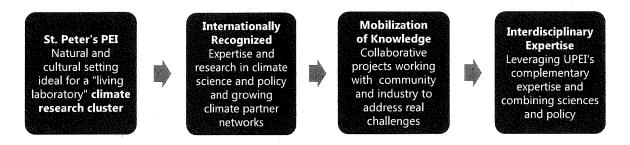


## 2.2 Proposed Direction

UPEI is proposing to establish the Canadian Centre for Climate Change and Adaptation, including four Research Centres of Excellence to support the creation of new climate change knowledge, adaptation, and innovation needed to accelerate Canada's transition to a clean growth economy. This transition will enable the promotion of the productivity and health of Canadian communities over the long-term.

The proposed Canadian Centre for Climate Change and Adaptation will mobilize new knowledge and expertise that is applied locally and adapted at national and global levels. The enhanced direction and focus on climate change for UPEI, as outlined in this document, exemplifies the four pillars of the University that build on core strengths: Student Experience, Vibrant Communities, Exploration and Discovery, and Long-term Sustainability.

The Centres of Research Excellence in Climate Change and Adaptation will be housed within the Canadian Centre for Climate Change and Adaptation hosted by UPEI and located in St. Peter's, PEI. Researchers, students, and partners will have ready access to the internationally-recognized UPEI Climate Research Lab, as well as access to outstanding global climate partner networks, and researchers in diverse areas of climate and climate-related areas of expertise being developed through new higher learning and research programs. The Centre's location provides an advantage to researchers and students with its close proximity to protected land and unique ecosystems within Parks Canada's National Park at Greenwich. Its location in Eastern PEI further supports the University's strategy to develop transformative and immersive climate change programs 'in the field' with strong collaboration and community outreach.



# 3.0 Project Outcomes and Benefits

The Canadian Centre for Climate Change and Adaptation proposes to mobilize new knowledge and expertise in climate change through the advancement of higher learning, building research expertise and supporting evidence-based decision making, and accelerating innovation in relation to climate change, adaptation, and resilience. This will be done through a highly-collaborative approach involving undergraduate and graduate students, expert faculty, and visiting researchers, working with community, industry and government. These outcomes are anticipated to generate benefits on a local and national scale with the potential for lessons learned to be applied internationally.

	Expected Outcomes
Advancement	Foster the development of the next generation of climate leaders who will emerge
of Higher Learning	from their studies to excel and contribute to the betterment of our local and global communities
J	Provide students with unique, experiential 'real world' learning opportunities in climate change
Building Research Capacity in Climate Change and Adaptation	Improve assessment of climate risk and impact in relation to key sectors and industries (such as agriculture, aquaculture, tourism, construction), critical infrastructure, and impacts such as coastal erosion, that are essential to the prosperity and growth of the regional economy
	Improve observation, monitoring, and surveillance networks that directly impact climate related health, wildlife and ecosystem health, food production and supply (climate science, climate observations, scenarios of future climate, mapping and visualization of climate change, climate mitigation and adaption, economics of climate change, etc.)
Building Capacity in Evidence- Based Decision Making	Build capacity in the <b>development of government policies and actions</b> in long-term climate mitigation and adaptation, and economic investment in infrastructure
	Build capacity to support the sustainability of agriculture, aquaculture, tourism and other key economic sectors in relation to climate change mitigation and adaptation, and realize economic opportunities related to new technology adoption
	Build capacity to advance the knowledge of municipalities and industry professionals including engineers, land-use planners, natural resource managers, and others in climate change
Acceleration of Innovation	Contribute to the development of a "clean growth economy" through higher learning and research, as well as advancing economic knowledge of climate change impacts
	Provide vital support for private businesses, entrepreneurs, and start-ups that is needed to transform knowledge and research into action to support clean technology development
	Support key economic sectors in realizing economic opportunities related to new clean growth technology adoption, scalable technologies



3.1 Supporting Climate Change Adaptation in the Community and a Clean Growth Economy
This transformative, unique in Canada approach to climate change and adaptation research will greatly
benefit local, regional, and national economies, in addition to the long-term sustainability of
communities and the well-being of citizens.

#### 3.2 National and Regional Relevance

There are significant benefits of critical magnitude and relevance directly associated with the proposed Centre and research cluster. These include, but are not limited to:

- growth in the skills, knowledge, and understanding necessary to build capacity in decision making and policy development in sectors to Atlantic Canada – this cannot be understated
- development of much needed collaborative projects with industry to address challenges and opportunities through development and adoption of new scalable and practical clean technology products and solutions that will lead to entrepreneurial ideas and advances in climate change mitigation, resilience, and adaptation strategies greatly improved 'local' knowledge about climate change impact and resilience—which research shows the to be of critical importance in climate change adaptation to support a clean growth economy and related economic benefits associated with this high growth sector (direct, indirect and induced spin offs and good jobs for Canadians)
- capacity building and knowledge acquisition among land use planners, engineers and other
  professional and industry sectors responsible for considerable planning, decision making, jobs
  and prosperity, and overall economic impact
- research development and dissemination of information to support the sustainability of agriculture, fisheries, aquaculture, tourism and other traditional and emerging sectors that are key to economic prosperity and quality of life
- positive impacts to address national concerns about the growing cost of climate change on Canada's prosperity, public health, and in coastal areas. (The National Round Table on the Environment and the Economy, a government-funded think tank, estimated the cost of climate change for Canada at \$5 billion per year in 2020 increasing to between \$21 billion and \$43 billion per year by 2050. Source: http://www.cbc.ca/news/politics/climate-change-could-costbillions-a-yearby- 2020-1.1097373)
- acting on climate change through adaptation and mitigation strategies is a key way to drive down costs and will reduce associated risks including to critical infrastructure, food security, human health, and economic growth – these areas are priorities nationally and internationally
- the continuation of a strong and vibrant university generates direct, indirect, and induced economic spin off in the provincial economy including with the attract of leading researchers to live and work in Prince Edward Island



#### 3.3 Community Relevance in Rural PEI

Positive impacts on the community of St. Peters and the surrounding area include, but are not limited to:

- direct, indirect, and induced economic spin off as a result of more dollars spent in the rural community
- greater diversity in the community as a result of researchers, faculty, visiting researchers, and students of different backgrounds, experiences and cultures from around the world interacting with local residents
- increased visitation in the longer-term from visitors, development of businesses to deliver products and services, and potential experiential tourism offerings through Parks Canada – a priority of the Prince Edward Island tourism industry
- 3.4 New Climate Change and Adaptation Higher Learning Programming within the Canadian Centre for Climate Change and Adaptation

Within the proposed Canadian Centre for Climate Change and Adaptation UPEI's Department of Science and School of Graduate Studies will deliver highly innovative and relevant programming a Bachelor of Science in Applied Climate Change and Adaptation and a Master of Science in Climate Change and Adaptation.

Approved by the UPEI Board of Governors, UPEI Senate, and Maritime Provinces Higher Education Commission (the regional authority for post-secondary programming quality assurance), UPEI's new Bachelor of Science in Applied Climate Change and Adaptation will examine theoretical aspects of how science, policy, and human populations interact in creating and solving climate change challenges, while engaging students in hands-on, technology-based learning.

The UPEI Bachelor of Science in Applied Climate Change and Adaptation is purposely innovative in design and delivery. In keeping with priorities outlined within the UPEI Strategic Plan and UPEI Academic Plan, the program strongly aligns with UPEI's vision to be a leader in experiential learning opportunities that encourage students to develop to their full potential in both the classroom and the community.

To make it unique to the region and country, UPEI brought together best practices of other successful climate programs throughout North America and Europe. The University also considered recent evidence-based results of the MPHEC Class of 2012 Maritime University Graduates: Pathways to Employment survey.

This survey shows strong progression of graduates from Applied Arts and Sciences and Professional programs moving directly into the workforce after graduation. In addition, graduates of this group have demonstrated strong interest in pursuing a second credential or further studies—most notably, graduate studies.

The main objectives of the program include: developing climate leaders who understand essential biological and physical sciences and their processes in relation to climate; understand the broader social and economic policy implications of climate change; possess analytic skills that enable them to interpret, understand, and predict climate impacts and climate models; develop critical thinking skills to effectively evaluate evidence and processes, and make sound decisions on adapting to climate change; and



continually develop their teambuilding, communication, and digital literacy skills that enable them to effectively collaborate and communicate.

The result is a program that will examine theoretical aspects of how science, policy, and human populations interact in creating and solving climate change challenges, while engaging students in hands-on, technology-based learning in an experiential manner beyond the traditional classroom and textbooks. For example, students will learn to use state-of-the-art drone technology and computer game programming surveillance instrumentation to develop skills to assess the vulnerability, impacts, and adaptation to climate change. In addition to flying and immersing drones to gather data, students will learn, among other outcomes, to:

- ✓ use GIS to map and visualize climate change;
- ✓ analyze climate change in a way that takes future industry and community impacts real and tangible;
- ✓ design and set up climate stations;
- ✓ participate in United Nations-style climate governance summits; and
- ✓ examine paleoclimatalogical indicators of climate.

Students will further benefit from the program's concentration on hands-on learning and skill development through a high degree of small group exercises/projects, laboratory work, fieldwork, community engagement, and field courses — including two senior level field courses delivered by UPEI's educational and research partner The Smithsonian Institution.

Graduates of the program will have relevant knowledge and skills to compete for a diverse range of career opportunities related to science, social, and policy aspects of climate change in areas ranging from entrepreneur-based businesses to all levels of government. The program will also provide graduates with entry level requirements needed for many professional and graduate programs in related fields, including areas such as climate related science programs, meteorology, policy, law, public administration, data analytics, and more.

#### A UNIQUE DELIVERY MODEL

- Applied learning
- Selective domestic and international student recruitment
- 'Living Laboratory' in rural Greenwich, PEI
- Problem solving with community and industry projects
- Student work-integrated-learning placements with organizations such as Parks Canada and other stakeholders
- International partners and recognition
- Next generation leaders in climate change and adaptation

Summer work-integrated-learning (WIL) opportunities with industry and government organizations will also differentiate the program. It is UPEI's intention that all students within the program will be employed during two summer WIL sessions, during which students are paid and earn program credits. A



number of government and industrial partners have expressed interest in participating in climate-related WIL to advance their respective organizations' objectives while contributing to development of future skilled labour. The real-world experience gained by students will assist them in securing jobs upon graduation. The strength of the program's WIL aspect will aid in employer and community partnerships as it encourages the competencies and networks needed to "...build a highly skilled and productive labour force for an innovative, strong, and growing economy." (Canadian Chamber of Commerce on the benefits of WIL).

UPEI currently delivers an interdisciplinary liberal arts and science Environmental Studies program that offers a broad base of Arts, Science, and Business courses to provide students with the ability to understand environmental connections across fields. UPEI's Bachelor of Science in Applied Climate Change and Adaptation will build increasingly concentrated knowledge and application of fundamental sciences, incorporate new fields of study (such as data analytics focused on climate change, geographic information systems, and climate coastal sciences), and use technologies previously not used within UPEI curriculum, to leverage existing Environmental Studies strengths within the first two years of the new program. This complementary model will serve to build an emerging cluster of expertise at UPEI, and an enhanced level of faculty collaboration across disciplines.

Together, the existing Bachelor of Environmental Studies and new Bachelor of Science in Applied Climate Change and Adaptation will enable UPEI to develop a robust climate-concentrated undergraduate focus that will serve to develop career-ready professionals and a new generation of graduate students with broad environmental awareness and specialization in climate change science.



# 4.0 Recipient

The Canadian Center for Climate Change and Adaptation will be established, operated, and maintained by the University of Prince Edward Island. The University of Prince Edward Island is governed by a Board of Governors and a Senate, instituted under the terms of the Prince Edward Island government's University Act.

# 5.0 Project Governance

The University of Prince Edward Island has established a Project Management Team responsible for governing the project from the planning stage through to the end of construction. The Project Management Team composition can be found in Appendix B.

UPEI will hire a construction management firm to manage the overall construction project. They will report to the Project Management Team and will be responsible for managing the project schedule, subcontracting and supervising resources for the project, project communications, managing project risks and keeping the project on time and budget.

UPEI will hire a capable financial management team to oversee the financial aspects of the capital project. They will continuously monitor actual costs to budget and work with the construction manager to make adjustments as required. They will be responsible for managing the cash flow of the project, receiving and processing invoices after approval by the construction manager, reporting to Senior Management, funders and other sources of financing during the project.

Subsequent to project completion, ongoing asset management and planning will be the responsibility of <u>UPEI Facilities Management</u>. Facilities Management maintains specific policies at UPEI, including indoor air quality, storage, signage, maintenance and painting. Maintenance priorities are defined under the <u>Work Order Priorities policy</u>, and maintenance is performed by the Facilities Management Maintenance Division.



# 6.0 Financial

6.1 Proposed Project Costs and Financing

Land and site improvement costs are estimated at an and will consist of activities required to prepare the land for the Centre's construction, including earthwork, landscaping, and paving.

In keeping with climate action priorities, it is proposed that the new Centre and student residence be constructed and operated in a sustainable manner, meeting or exceeding the energy efficiency requirements of the Model National Energy Code for Buildings. The buildings' high efficient design features will include renewable energy sources such as wind and solar, geothermal heating and a green roof. In 2017 UPEI engaged to prepare Class D concept budgets for the new Centre and residence. The construction budget estimate is per square foot for the Centre and per square foot for the student residence, exclusive of specialized technology and equipment. On this basis, the capital costs for the construction of the buildings are estimated to be Although the estimated cost is significant, investing in energy efficiency up front makes the facilities more financially sustainable in the long-term, and sends a clear environmental message that is core to the overall purpose of the Centre.

Access to specialized equipment and leading-edge technology is vital to administering educational programming and advancing research in the area of climate change and adaptation. Through extensive consultation with faculty and industry experts, UPEI has identified the technologies and equipment required for the Canadian Centre for Climate Change and Adaptation and Research Centres of Excellence. Specialized equipment and leading-edge technology are estimated to be Examples of technologies and equipment include small, unmanned air vehicles (sUAVs), aerial senor packages, real-time kinetic global positioning systems, field monitoring kits and supplies, research boat, trailer, backup generator and state-of-the-art communications infrastructure, computer equipment, networks, servers, and security systems for data storage and management in rural PEI.

Table 1: Detailed Project Cost Table

	Description of Activities	Eligible Costs	ineligible Costs	Total Project Costs
Land improvements and site customization Building	St. Peters and Greenwich area of rural PEI Centre for Climate Change and Adaptation and student residence. Capital cost estimate provided by	\$	\$ .	\$
Specialized Equipment and Leading-Edge Technology Total Estimated Costs	January 2019. Please refer to Appendix E for a detailed list		-   <b>\$</b> -	



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For the purpose of budgetary and planning purposes, the proposed financing structure is as follows (Table 2):

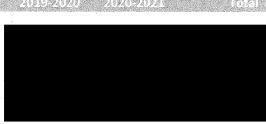
Table 2: Sources of Funding

Funding Source	Funding Request
Infrastructure Canada – Non-repayable capital co	ntribution \$
Atlantic Canada Opportunities Agency – Non-repa	ayable capital contribution
UPEI – Fundraising and Donations	
Total Proposed Project Financing	\$

An estimated expenditure profile reflecting total eligible expenditures, by fiscal year and by funding source is illustrated in Table 3.

Table 3: Estimated Project Cash Flow (Based on Total Eligible costs, in dollars)

Funding Source 2019-2
Infrastructure Canada – Non-repayable capital contribution
Atlantic Canada Opportunities Agency – Non-repayable capital contribution
UPEI – Fundraising and Donations
Total Proposed Project Financing



#### 6.2 Operations

Detailed financial projections illustrating UPEI's capacity to operate and maintain the Centre on a sustainable, long-term basis can be found in Appendix F. The following is an overview of key operational assumptions and financial impact of alternative approaches.

### Number of Students

UPEI will intentionally maintain a competitive and capped enrollment to enhance the quality of education and the exclusivity of its Bachelor and Master programs. Maintaining smaller cohorts of students will allow for students to have greater access to experienced faculty and resources, while at the same time creating a highly-collaborative learning environment.



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# 7.0 Legal

Appendix C contains a letter from the UPEI Comptroller, Tara Judson, stating the project will adhere to all applicable legislation and that all necessary permits and authorizations required for the project will be obtained.

The completed and signed Environmental, Aboriginal Consultation and Project Location Questionnaire can be found in Appendix D.

The University of Prince Edward Island has <u>documented purchasing guidelines</u> which will be followed for purchases related to this project. Construction over \$100,000 requires a formal request for proposal or request for quotation. Costs under \$100,000 are subject to a minimum of two documented competitive quotations.



# 8.0 Risk Mitigation

UPEI has established a Project Management Team (see Appendix B) and will hire a construction management firm to manage the overall construction project. They will be responsible for managing the project schedule, subcontracting and supervising resources for the project, project communications, managing project risks and keeping the project on time and budget.

UPEI will hire a capable financial management team to oversee the financial aspects of the capital project. They will continuously monitor actual costs to budget and work with the construction manager to make adjustments as required. They will be responsible for managing the cash flow of the project, receiving and processing invoices after approval by the construction manager, reporting to Senior Management, funders and other sources of financing during the project.

UPEI will enter legally-binding contracts with project contractors. Contracts will include appropriate holdbacks as per the Prince Edward Island Mechanics' Lien Act. Furthermore, UPEI will require contractors to provide construction bonds as a type of surety to protect against any disruptions or financial loss as a result of the contractors' failure to meet contract specifications.



Appendix A: Land Specifications, Site Map and Aerial Images



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File No. 17-11-004C-Revised

## APPRAISAL OF



# LOCATED AT:

St. Peters Bay, PE, C0A

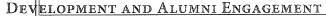
FOR:



AS OF:

November 14, 2017

BY:



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ATIA - 20(1)(c)
ATIA - 20(1)(d)



File No. 17-11-004

# **Altus** Group

APPRAISAL OF



Vacant lot

LOCATED AT:

St. Peters Bay, PE, C0A

FOR:



AS OF:

November 14, 2017

BY:

Charlottetown, PE.

ATIA - 13(1)(c) ATIA - 19(1) ATIA - 20(1)(b)
ATIA - 20(1)(c)
ATIA - 20(1)(d)



File No. 17-11-004B

# **Altus** Group

APPRAISAL OF



Vacant Lot

LOCATED AT:

St. Peters Bay, PE, C0A

FOR:



AS OF:

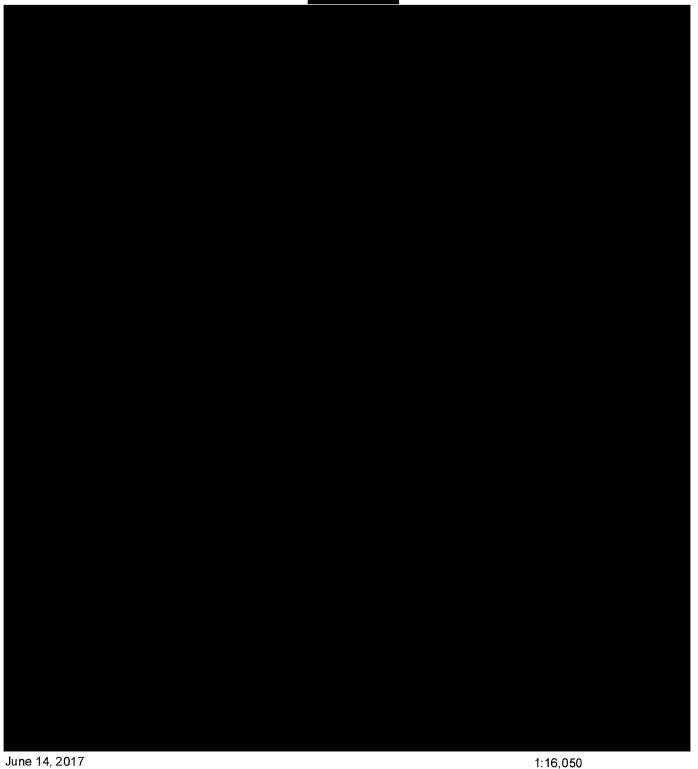
November 14, 2017

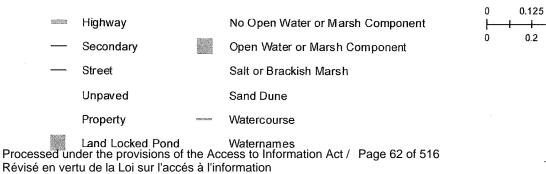
BY:

Charlottetown, PE.

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0.25

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Appendix B: Project Management Team





# Canadian Centre for Climate Change and Adaptation

# **Project Management Team**

Ms. Jackie Podger, Vice-President, Finance and Administration

Dr. Robert Gilmour, Vice-President, Academic and Research

Dr. Adam Fenech, Director, Climate Lab

Ms. Tara Judson, Comptroller

Mr. Greg Clayton, Director, Facilities Management

Ms. Myrtle Jenkins-Smith, Executive Director, Development

Ms. Charlotte McCardle, Manager, Strategic Development & Implementation

Appendix C: Comptroller Letter





# Office of the Comptroller

May 24, 2018

To Whom It May Concern:

Re: Project Proposal - Infrastructure Canada (INFC)

I acknowledge that the project will adhere to all applicable legislation and that all necessary permits and authorizations required for the project will be obtained

Sincerely,

Tara Judson

Comptroller, UPEI

Appendix D: Environmental, Aboriginal Consultation and Project Location Questionnaire



# Environmental, Aboriginal Consultation and Project Location Questionnaire

Please note that if you are completing this questionnaire due to a proposed project amendment for a project already submitted to Infrastructure Canada (INFC), please only include the amended project information.

### Part A.1: General information

#### **Project Name:**

Canadian Centre for Climate Change and Adaptation

#### **Project Proponent:**

University of Prince Edward Island

Contact person and their contact information for any question Infrastructure Canada could have regarding the environmental assessment and/or aboriginal consultation:

Dr. Alaa Abd-El-Aziz

Address: 550 University Avenue, Charlottetown, PE, C1A 4P3

Phone:

902-566-0400

Email:

abdelaziz@upei.ca

# Part A.2: Project and existing environment description

#### **Project Description:**

Please refer to Section 1 Project Description of the Project Business Case.

#### Description of the existing environment:

Please refer to Section 1 Project Description of the Project Business Case.

# Part B: Environmental Assessment Questionnaire

<u>Instructions to respondent:</u> For **Parts B and C of the Environmental Assessment Questionnaire**, select only "Yes" if applicable to the proposed project. When "Yes" is not selected, "No" will be assumed.

opjects identified on the Regulations Designating Physical Activities - ret of your project involve the construction, operation, decommissioning or not of the following infrastructure?  Electrical transmission lines  Electrical generating facility  Structure for the diversion of water including dam, dyke or reservoir  Canal, lock or structure to control water level  Oil and gas pipeline  Marine terminal  Railway line and / or Railway yard  All season public highway  Aerodrome, airport or all-season runway  Hazardous waste facility  Waste management facility
Electrical transmission lines Electrical generating facility Structure for the diversion of water including dam, dyke or reservoir Canal, lock or structure to control water level Oil and gas pipeline Marine terminal Railway line and / or Railway yard All season public highway Aerodrome, airport or all-season runway Hazardous waste facility
Electrical generating facility Structure for the diversion of water including dam, dyke or reservoir Canal, lock or structure to control water level Oil and gas pipeline Marine terminal Railway line and / or Railway yard All season public highway Aerodrome, airport or all-season runway Hazardous waste facility
Structure for the diversion of water including dam, dyke or reservoir Canal, lock or structure to control water level Oil and gas pipeline Marine terminal Railway line and / or Railway yard All season public highway Aerodrome, airport or all-season runway Hazardous waste facility
Canal, lock or structure to control water level Oil and gas pipeline Marine terminal Railway line and / or Railway yard All season public highway Aerodrome, airport or all-season runway Hazardous waste facility
Oil and gas pipeline Marine terminal Railway line and / or Railway yard All season public highway Aerodrome, airport or all-season runway Hazardous waste facility
Marine terminal Railway line and / or Railway yard All season public highway Aerodrome, airport or all-season runway Hazardous waste facility
Railway line and / or Railway yard All season public highway Aerodrome, airport or all-season runway Hazardous waste facility
All season public highway Aerodrome, airport or all-season runway Hazardous waste facility
Aerodrome, airport or all-season runway Hazardous waste facility
Hazardous waste facility
Waste management facility
Industrial facility
Offshore exploratory wells
Off-shore floating or fixed platform, vessel or artificial island
International or interprovincial bridge or tunnel
Bridge over the St. Lawrence Seaway
any part of the project or activities proposed to be located within:  A wildlife area
A migratory birds sanctuary
A Illigratory Dirus Sanctuary
ne project a designated project according to the Regulations Designating Physical
No X Unknown
a guartian above, bove you provided the Conscient Environmental Assessment
e question above, have you provided the Canadian Environmental Assessment a project description as per Section 8(1) of the <i>Canadian Environmental Assessment</i>

	Federal Lands
NAME OF TAXABLE PARTY OF TAXABLE PARTY.	ny part of the project or activities be located on:  Federal land
Yes Yes	Indian Reserve land
res	IIIUIdii Reserve Idiiu
Paintill 5:	Would any part of the project or activities be located in:
Yes 🗌	Internal waters of Canada, in any area of the sea not within a province
Yes 🗌	The territorial sea of Canada, in any area of the sea not within a province
Yes 🗌	The exclusive economic zone of Canada
Yes 🗌	The continental shelf of Canada
-	swered "yes" to any of the above (B.4 and B.5), please provide the information regarding the and administrator and a description of federal lands (a map should be included if available).
N.	/A
	cate if the entire project footprint is located on federal lands. If not, please indicate the portion take place on federal lands.
N/.	Λ.
111/.	
Are impo	rtant environmental issues expected as a result of this project? If "yes", please elaborate.
NT	
N,	/A
Are impo	rtant public concerns expected as a result of this project? If "yes", please elaborate.
N/A	

	any part of the ed by previou		in whole or in part on l	and potentially	
To a man to the contract of th	umalikan in musimban ana umalikan disebah in musimban di		austra en	товит нетвы дотны шта мотот отпортно прои суднество по прои до него допосно по пода него допоснова дого.	encourses deservations described that the described of th
Comments (	if any):				
			ent available for this pro		
ganis mbair			ent available let tills pro	mert regarding	
Yes	No No	Phase I Phase II	N/A N/A	TYCHIR CHINABIRTY (TIS 1180 ITYAB LIYABIRIYARA), TISAA NOOMAARIAYI ARARAAYIYI IST CIIABIRI	*
Yes	No	Phase III	N/A	Notice 1990 the 1997 Annual tendritism to the Labellandon Number and apply their described to the	
not already	done. If the re	eport(s) is/are at	please provide any repor the development stage, r will be completed and w	please, provide the fo	ollowing
				:	
			in part) require a provi int under a northern reg		?

If you answered "yes", please provide any report(s) that are related to the project if not already done. If the report(s) is/are at the development stage, please, provide the following information: when it/they will be completed and when it/they will be sent to INFC.

# Part C: Aboriginal Consultation Questionnaire

Other F Aborigi	ederal or P	due to their in	vn - tments or Agencies who may have a duty to consult volvement in the project (e.g.: permit and/or authorization),
Yes 🗌	No X	Unknown 🗌	Fisheries and Oceans Canada (e.g. Fisheries Act)
Yes 🗌	No X	Unknown 🗌	Transport Canada (e.g. Navigable Waters Protection Act)
Yes 🗌	No X	Unknown 🔲 🗋	Environment Canada (e.g. Species at Risk Act, Migratory Birds Convention Act, Canadian Environmental Protection Act)
Yes 🗌	No X	Unknown 🗌	Natural Resources Canada (e.g. Explosives Act)
Yes 🗌	No X	Unknown 🗌	Canadian Environmental Assessment Agency
Yes 🗌	No X	Unknown 🗌	Parks Canada Agency
Yes 🗌	No X	Unknown 🗌	Health Canada
Yes 🗌	No X	Unknown 🗌	Other departments (e.g. federal department, provincial department, funding department,)  If applicable, please identify the federal department or agency and approval required)

If you answered "yes" to any of the above, please describe the involvement of the identified department(s)/agency(s) in detail.

Part C2:	Activities Rel	ated to the Project
Yes 🗌	No X	Does the project involve works or activities on, under, over, through or across a water body such as a wetland, stream, river or lake?
Yes 🗌	No X	Are there any land use changes that may affect traditional activities such as, but not limited to, deforestation or clearing of vegetation?
Yes	No X	Is any component of the proposed project located outside the existing project footprint?
Yes 🗌	No X	Will ownership of land change as a result of the project?
Yes 🗓	No 🗌	Is the project occurring on land that has yet to be developed / disturbed? <sup>5</sup>
Yes	No X	Are there any relevant project activities that might affect other aspects of the environment (e.g. sound and/or noise level increased, barrier limiting the access for harvesting, runoff in a watercourse excavating activity)?

<sup>&</sup>lt;sup>5</sup> If you answered yes, please, provide details regarding how much land will be affected by the project in the description below.

If you answered "yes" to any of the above, please provide a description or the activities described in part C.2.

The land is a field that has not been used for farming or personal use. We are building a Canadian Centre for Climate Change and Adaptation that will bring researchers from Atlantic Canada, Canada and Internationally to solve issues identified by our community.

Have you been in contact or do you plan to contact any Aboriginal groups regarding this project? If "yes", please provide some details regarding the nature of your communication and include in an attachment any information that may be useful (e.g. contact information, letters, emails, public notices, and any other types of communications).

Canadian indigenous communities' relationship to the environment is valuable for understanding climate vulnerability, impacts and adaptation. Discussions with Indigenous leaders will be taking place in the very near future.

Are any potential issues expected as a result of this project? If "yes", please elaborate.

No. Our Indigenous leaders have been a very strong part of our University. They have helped us to strenghten our programs. This will be another project we can collaborate on.

### Part D: Project Location Questionnaire

In order to facilitate and accelerate the assessment of your request for funding, Infrastructure Canada needs to geographically locate your project accurately. The information provided will ensure the proper location of the project for future reference. You are therefore asked to complete this questionnaire to the best of your knowledge and with as much precision as possible.

Part D.1: Project Location SEE APPENDIX				
	Address of the project	Location 1	Location 2	
ress	Civic Numl	er:		
	Unit/Suite/	pt:		
pp	Street Na	me:		
9	Municipa	ity:		
ixe	Cou	nty:		
i.	Provir	ce:		
<u>\\ \bar{\bar{\bar{\bar{\bar{\bar{\bar{</u>	Postal Co	de:		
Project with fixed address	Project Longitude:			
<u> </u>	Project Latitude:			
	·			
S	Additional Project Location Details:			
res	Please indicate, for each project component, any points of interest, intersections, major			
idd	highways or streets, or other physical characteristics located in the vicinity of the project			
p o	(i.e. near airport, adjacent to Lions Gate Bridge, 3 km east from Centennial Park, at			
fixe	intersection of Fifth and Queen, etc.)			
00 0	Component A:			
th r	Component B:			
ct with no fixed addre multiple components	Component C:			
ect	Component D:			
Project with no fixed address or multiple components				
<u> </u>				
Project	t Location Documents:			

As a minimum, please include in an attachment (hard copy or electronic file) a project location map. If available, please include any further project location documents that may be useful in locating the project, such as: a site plan, hand drawings on a printed map, print of maps from Google Maps/Google Earth/MapQuest/Yahoo Maps etc., location plan, aerial photo, legal or written description of project location, survey plan, engineering plan, or any other plans or drawings from reports, studies or analysis.

# Part E: Declaration of Information

Part E.1: Declaration of Information:					
I certify that the information provided is accurate to my knowledge and understand that inaccurate					
information may result in the requirement for additional environmental and/or aboriginal review.					
O Dr Alos Abd El Agig					
Questionnaire completed by: Dr Alaa Abd-El-Aziz					
*					
Signature:	*				
J.Bilatare.					
Date: May 24, 2018					

Appendix E: Project Capital Cost Estimate and Proposed Capital

Financing Plan



ATIA - 20(1)(b) ATIA - 20(1)(c) ATIA - 20(1)(d)

# Canadian Centre for Climate Change and Adaptation Updated Total Capital Budget and Proposed Capital Financing Plan January 2019

# **Estimated Capital Costs**

Land

**Building Construction (See attached)** 

Centre for Climate Change and Adaptation

Residence

Equipment (See attached)

**TOTAL** 

# **Proposed Capital Financing**

Infrastructure Canada

University of Prince Edward Island

Atlantic Canada Opportunities Agency

**TOTAL** 



# Page(s) 78 to 81 are withheld pursuant to paragraph $\mathbf{1}3(1)(c)$ of the Access to Information Act

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La/les page(s) 78 to 81

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ATIA - 13(1)(c)

ATIA - 20(1)(b)
ATIA - 20(1)(c)
ATIA - 20(1)(d)

# CANADIAN CENTRE FOR CLIMATE CHANGE AND ADAPTATION SCHEDULE OF ESTIMATED SPECIALIZED EQUIPMENT COSTS

Centre for Coastal Systems Impacts
3 SUAWVs (small unmanned above water vehicles) with sensors (temperature probes, sonar, salinity, alkalinity)
3 SUUWVs (small unmanned under water vehicles) including fine resolution image and sonar
Floating buoy with sensors for waves (mean direction, height, peak period, zero crossing period, sea surface elevation)
Distributed low-cost wave buoys
Laboratory wave measurement instruments (specific for testing coastal protection scenarios in wave tank)
Ocean acidification lab set up
pH loggers/sensors (field deployments)
Multipurpose research boat with trailer
Field and laboratory hardware/gear
Centre for Clean Technology Innovation in Support of Agriculture and Aquaculture
Supplies
Field monitoring kit
Centre for Climate Change & Human Health, and Centre for Data & Policy Analysis for Transition to Low Carbon Economies
(Computational and Mathematical/Statistical Tools and Infrastructure - support all Research Centres)
Working lab area for training or seminar usage (15-20 units) [projector/large format display]
Server room with A/C and power conditioning, hardened physical security, and compute-core system for large-scale data
modelling using parallel processing
SAN (Storage Area Network) backend to maintain database access, and backup SAN offsite replication
Security systems building access (fob access), and server room monitoring (environmental/intrusion)
Large format colour printing (for maps, etc.) [Including laser printing capabilities, scanning, copier, etc.]
Internal gigabit networking (with minimum of 2 data ports per work area/i.e. per person)
Update meeting room with large displays, videoconferencing and curated video production/broadcast capabilities
Wireless with significant overcapacity to allow for rapid growth
Conduits preinstalled to rooftops to allow for external equipment (if external measurements are required, Antenna, etc.)
Upgrade to commercial data network in relevant regions where researchers will be working including exterior - LTE
Backup generator
Research break-out rooms and connected areas - touch screens and connections
Furniture, fixtures and computer equipment
Equipment Total (amounts are inclusive of non-recoverable taxes)

Appendix F: Projected Financial Statements



# Page(s) 84 to 102 are withheld pursuant to paragraph 20(1)(b), 20(1)(c) & 20(1)(d) of the Access to Information Act

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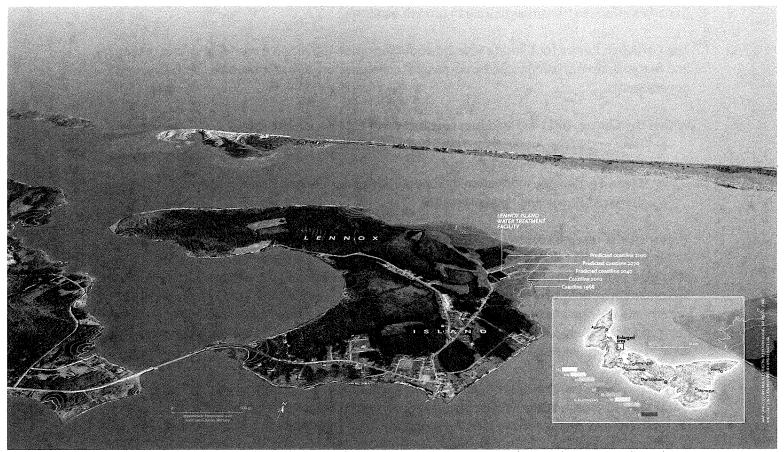
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20(1)(b), 20(1)(c) & 20(1)(d)
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Appendix G: Canadian Centre for Climate Change and Adaptation Business Plan (original, dated September 2017)



# CANADIAN CENTRE FOR CLIMATE CHANGE AND ADAPTATION

# CONFIDENTIAL



UPEI Climate Lab Sea Rise Visualization as featured in Canadian Geographic (May and June 2016 editions)

# **BUSINESS PLAN**

September 2017



# **FOREWORD**

The Canadian Centre for Climate Change and Adaptation hosted by the University of Prince Edward Island (UPEI) will work collaboratively to build capacity for evidence-based decision making needed to inform policy, advance research, and accelerate innovation to enable Canada's effective transition to a clean growth economy.

The Canadian Centre for Climate Change and Adaptation is built on a model of strong research and higher learning, hallmarked by purposeful collaboration with communities, industry, and governments.

Within the Centre, UPEI will lead four research centres of excellence in:

- Data and Policy Analysis for Transition to Low-Carbon Economies,
- Coastal Systems Impacts,
- Clean Technology Innovation in Support of Agriculture and Aquaculture, and
- Climate Change and Human Health.

Together, the research centres will form a cluster of discovery and new knowledge acquisition within the Canadian Centre for Climate Change and Adaptation. By leveraging existing strengths of the UPEI Climate Research Lab (a globally recognized climate research centre that has drawn the praise of research intensive institutions such as MIT and Stanford University), the climate change and adaptation knowledge cluster will be further developed through strong networks and timely partnerships to ensure the application of new knowledge and innovation within our communities.

Within the Canadian Centre for Climate Change and Adaptation, UPEI will deliver higher learning programs focused on developing much needed climate change professionals, researchers, and decision makers of the future, through UPEI's recently approved Bachelor of Science in Applied Climate Change and Adaptation, as well as a Master in Climate Change and Adaptation that is in development.

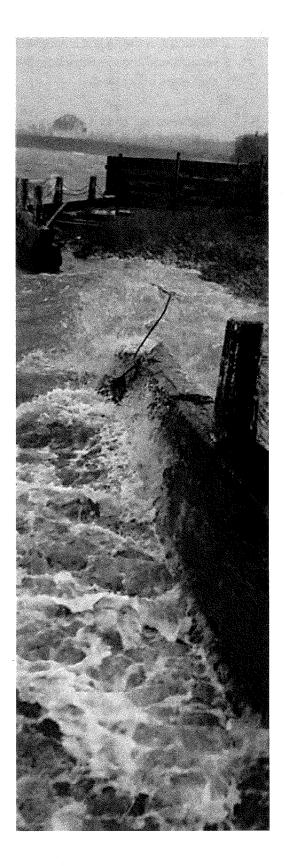
The Canadian Centre for Climate Change and Adaptation's commitment to scientific discovery, application, and new climate change knowledge will provide Canada with the capacity to deliver climate change solutions needed to advance Canada's clean growth economy for the prosperity and well being of all our citizens.

Alaa S. Abd-El-Aziz, B.Sc., M.Sc., Ph.D., FCIC President and Vice-Chancellor, University of Prince Edward Island

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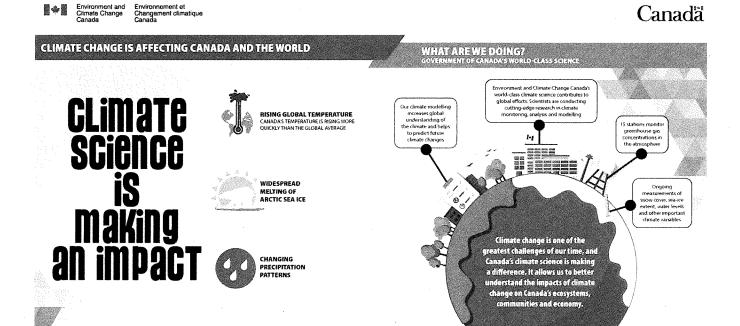
### **EXECUTIVE SUMMARY**

Building on existing and emerging expertise, UPEI is taking a national leadership role in building knowledge capacity and accelerating innovation in the area of climate change and adaptation – one of the greatest challenges of our time.

To achieve this, UPEI is proposing to establish the **Canadian Centre for Climate Change and Adaptation**, including four Research Centres of Excellence, to support the creation of new climate change knowledge, adaptation, and innovation needed to accelerate Canada's transition to a clean growth economy that is necessary to promote the long-term productivity and health of our Canadian communities.

The new UPEI Research Centres of Excellence will be housed within the proposed Canadian Centre for Climate Change and Adaptation at a UPEI satellite campus to be located in St. Peter's, PEI. This location provides an advantage to researchers, students, and partners with its close proximity to protected land and unique ecosystems within Parks Canada's National Park at Greenwich. The Centre's location in Eastern PEI supports the University's strategy to develop transformative and immersive climate change programs 'in the field' with strong collaboration and community outreach.

Research conducted through the new Research Centres of Excellence will build new knowledge and capacity to address climate related risk assessment, develop mitigation and adaptation strategies, and support clean technology development. Knowledge and solutions will be applied and adapted to communities locally, nationally, and globally.



CHANGES IN FREQUENCY AND INTENSITY OF EXTREME EVENTS

onadas addressing it visit climate charge

# 1.0 A FORTIFIED APPROACH TO BUILDING CAPACITY IN CLIMATE CHANGE AND ADAPTATION

### VISION AND STRATEGIC PRIORITIES

The Canadian Centre for Climate Change and Adaptation will be a leader in climate change adaptation and resilience by building capacity for evidence-based decisions that are needed to inform policy, advance research, and accelerate innovation for the prosperity and well-being of all citizens.

The strategic priorities of the Canadian Centre for Climate Change and Adaptation include:

- to provide government and industry with next generation professionals and researchers who have the skills and experiences that are required to help communities remain sustainable in the face of climate change (from the perspectives of economic, well-being/health, and culture);
- to deliver truly unique experiential learning and discovery opportunities for students, faculty, and visiting researchers who will have a direct impact on community, industry, and public policy; and
- to work with businesses, industry, communities, and government to determine the solutions to climate
  change challenges that will inform public policy in a manner that supports sustainable communities,
  adaptable sectors, and entrepreneurial developments, enabling transition to a clean growth economy.

The Research Centres of Excellence within the Canadian Centre for Climate Change and Adaptation will build capacity in four core areas:

Data and Policy Analysis for Transition to Low-Carbon Economies

**Coastal Systems Impacts** 

Clean Technology Innovation in Support of Agriculture and Aquaculture

Climate Change and Human Health

The Research Centres of Excellence will leverage UPEI's **proven track record** in mobilizing new knowledge in climate change, working with local, national, and international communities, as well as **interdisciplinary research** through collaboration with existing and complementary expertise at UPEI, and climate change networks around the world.

### PROPOSED DIRECTION

UPEI is proposing to establish the Canadian Centre for Climate Change and Adaptation, including four Research Centres of Excellence to support the creation of new climate change knowledge, adaptation, and innovation needed to accelerate Canada's transition to a clean growth economy. This transition will enable the promotion of the productivity and health of Canadian communities over the long-term.

The proposed Canadian Centre for Climate Change and Adaptation will mobilize new knowledge and expertise that is applied locally and adapted at national and global levels. The enhanced direction and focus on climate change for UPEI, as outlined in this document, exemplifies the four pillars of the University that build on core strengths: Student Experience, Vibrant Communities, Exploration and Discovery, and Longterm Sustainability.

The Centres of Research Excellence in Climate Change and Adaptation will be housed within the Canadian Centre for Climate Change and Adaptation hosted by UPEI and located in St. Peter's, PEI. Researchers, students, and partners will have ready access to the internationally-recognized UPEI Climate Research Lab, as well as access to outstanding global climate partner networks, and researchers in diverse areas of climate and climate-related areas of expertise being developed through new higher learning and research programs. The Centre's location provides an advantage to researchers and students with its close proximity to protected land and unique ecosystems within Parks Canada's National Park at Greenwich. Its location in Eastern PEI further supports the University's strategy to develop transformative and immersive climate change programs 'in the field' with strong collaboration and community outreach.

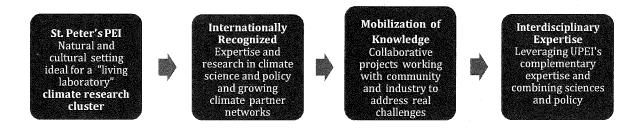




Photo: UPEI Climate Research Lab

# ALIGNMENT WITH UPEI PRIORITIES

UPEI has a proud history, successful alumni, a strong relationship with community, and engaged and talented faculty, staff, and students. Working collaboratively and building on its many strengths, UPEI is committed to success through transformation.

UPEI has an impressive track record of educating leaders and attracting internationally-renowned experts who are discovering new knowledge and applications needed for the health and prosperity of communities at home and around the world. By focusing on potential through a shared sense of purpose and values, UPEI continues to pursue educational excellence and position the University as an academic and research leader, and as a destination for those driven by discovery.

UPEI strategically strives to achieve its vision to deliver outstanding experiential learning opportunities that encourage students to develop to their full potential in both the classroom and the community; to be a destination for those eager to advance the world by creating new knowledge; and to foster the development of tomorrow's leaders who will emerge from their studies ready to excel and contribute to the betterment of our global and local communities.

The proposed Canadian Centre for Climate Change and Adaptation and Research Centres of Excellence are well-positioned to prosper through UPEI's commitment to achieve its vision.

UPEI proudly offers world-class resources, access to global leaders, and outstanding partner networks within a small, comprehensive university setting. This enables the University and the province to demonstrate the benefits of being nimble, innovative, strongly connected, and globally competitive.

UPEI is the only small university in Canada that is home to:

- · a Canada Excellence Research Chair,
- · a Lévesque Research Chair,
- the only UNESCO Chair east of Quebec,
- a Centre of Excellence for Commercialization and Research (CERC),
- the UPEI Climate Research Lab and MIT-award winning technology for visualizing coastal erosion and sea-level rise, and
- Canada First Research Excellence funding.

UPEI has achieved exponential growth in research and was **ranked first in Canada for attracting research dollars** by MacLean's Magazine in 2016. **UPEI ranked 2<sup>nd</sup> for research intensity and 4<sup>th</sup> for international research collaboration** among 22 primarily undergraduate Canadian universities by Research Infosource Inc.

# A TIME FOR ACTION

The Government of Canada, as well as global leaders such as the United Nations and G20, have identified climate change as one of the greatest challenges of our time. With wide-spread recognition and growing concerns about climate change, an urgent need exists to advance education, research, and knowledge transfer to future climate leaders and decision makers.

The *Paris Agreement* brings all nations into a common cause to undertake ambitious efforts to combat climate change and adapt to its affects. Canada's participation in the international climate conference in Paris signals a determined new approach to domestic and international collaboration to achieve a climate change agreement.

The Prime Minister of Canada has communicated the need for Canada to do more to address the global challenge of climate change indicating that "...our government is making climate change a top priority [which is] necessary for our collective health, security, and prosperity..."

Advances in climate science will enable a clean growth economy that supports the creation of new jobs, an improved quality of life, and innovations that are capable of supporting the long-term sustainability of our environment, health, and economic sectors...

In pursuing climate change advances, the Government of Canada has set clear principles to:

- act based on best scientific evidence and advice;
- develop and implement policies that contribute to a low-carbon economy; and
- take leadership roles on climate change including community mobilization, innovation, and sharing knowledge with developing countries.

A **clean growth economy** is at the forefront of Government of Canada priorities, recognizing that protecting the environment and growing the economy go hand-in-hand. Canada needs to be better positioned to take advantage of opportunities in the new global economy through a diversified economy that creates new innovation and opportunity, while supporting the sustainability of communities and key economic sectors.

The Government of Canada has committed to continued investments in education, research and development that will strengthen Canada's clean energy and technology sectors (Government of Canada, Canada's Vision for a Clean Growth Future, www.canada.ca/en/services/environment/weather/climatechange/vision-clean-growth.html).

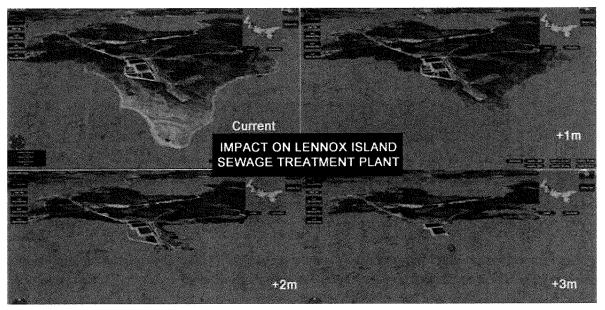
"Clean growth and climate change" is one of five action areas identified in the *Atlantic Growth Strategy*, a strategy identifying cooperative actions among the Government of Canada and four Atlantic Provinces. A focus on climate change is important in Atlantic Canada to stimulate economic growth, create clean jobs, and drive innovation in the transition to a low-carbon economy.

According to Canada Climate Action Network and other organizations, Atlantic Canada is recognized as **one of Canada's regions most threatened by global climate change**. As warming in global temperatures will result in an increase in storm events, intensity, rising sea levels, storm surges, coastal erosion and flooding, Atlantic Canadian's coastal communities will become increasingly vulnerable, with vital infrastructure and industries that are key economic drivers for the Atlantic region (such as agriculture, aquaculture, fisheries, and tourism) being adversely impacted (<a href="http://climateactionnetwork.ca/issues/impacts-and-adaptation/learning-cente/impacts-incanada">http://climateactionnetwork.ca/issues/impacts-and-adaptation/learning-cente/impacts-incanada</a>). As a result, these economic sectors and overall prosperity are at risk due to climate change impacts.

The Province of Prince Edward Island strongly echoes its support for the Government of Canada's action plan on climate change and the need for knowledge transfer that supports a clean technology economy. The Province's most recent plan, A Mighty Island: A Framework for Economic Growth, outlines PEI's priority to integrate adaptation strategies into economic sectors while growing R&D related innovation and start-ups.

The importance of climate change action and the development of a clean growth economy by federal and provincial governments is a good indication of the trajectory for growth in demand for individuals with expertise in climate change and adaptation that are capable of spearheading change and working collaboratively towards solutions. The ability to respond to such demand for expertise can only be fostered through higher learning.

UPEI stands poised to accelerate and enhance its existing focus on climate change and adaptation research in a manner that will advance Canada's climate change agenda. This will be accomplished through the proposed Canadian Centre for Climate Change and Adaptation and four research centres of excellence.



**UPEI Climate Research Lab** 

ATIA - 13(1)(c)

ATIA - 20(1)(b)
ATIA - 20(1)(c)

ATIA - 20(1)(d)

Canadian Centre for Climate Change and Adaptation: Business Plan

# **FINANCIAL IMPLICATIONS**

Detailed project costs and financing implications are provided in section 5 of this document. As an overview, the construction budget estimate based on a preliminary concept-level design is per square foot, exclusive of specialized technology and equipment. On this basis, capital costs for the construction of the building are estimated to be

### **Estimated Total Project Costs**

	Year One to Three
Land, land improvements and site construction	
Building	
Specialized equipment and leading-edge technology	
Computer equipment	
Furniture and fixtures	
Total capital costs	
Start up and industry collaboration launch	
TOTAL PROJECT COSTS	

Access to specialized equipment and leading-edge technology is vital to administering educational programming and advancing research in the area of climate change and adaptation. Through extensive consultation with faculty and industry experts, UPEI has identified the technologies and equipment required for the Canadian Centre for Climate Change and Adaptation and Research Centres of Excellence. Specialized equipment and leading-edge technology are estimated to be

For the purpose of budgetary and planning purposes, the proposed financing structure is as follows:

### **Proposed Project Financing**

	Year One to Three
Fundraising and donations	
Non-repayable government start up contributions	
Non-repayable government capital contributions	
Total Proposed Project Financing	

An investment in the establishment of the Canadian Centre for Climate Change and Adaptation and Research Centres of Excellence is an investment in the collective health, security, and prosperity of Canadians. UPEI is ready and able to play a significant role working with leading climate experts, government, non-government, community and industry partners to advance research, knowledge, and mobilization of climate change and adaptation to address one of the greatest challenges of our time.

# 2.0 RESEARCH CENTRES OF EXCELLENCE WITHIN THE CANADIAN CENTRE FOR CLIMATE CHANGE AND ADAPTATION



**Coastal** System Impacts Clean Technology Innovation in Support of Agriculture & Aquaculture

Climate Change and Human Health

- Experiential learning & discovery
- Research & knowledge transfer = public policy
- Community engagement & sustainability
- · Innovative industry partnerships
- Clean growth technology & developments
- Provincial, Atlantic Canadian, & national priorities

The four synergistic Research Centres of Excellence define UPEI's agenda to advance knowledge, products, and services to better inform decision makers about climate change related risks and optimal adaptation approaches. Through an integrated approach to climate change and adaptation research, the centres will be a destination for world-class research and learning, providing expertise and collaboration within a living laboratory setting hallmarked by access to high quality datasets, multidisciplinary research teams, outstanding graduate and postdoctoral fellows, and engaged industry, community, and government partners.

These elements create an interactive environment that will foster new knowledge and R&D for climate change innovation and adaptive solutions. By the nature of their focus to use predictive analysis to determine future scenarios, a priority exists within the Centres to train high quality personnel and climate scientists for anticipated jobs and research needs resulting from climate impacts.

Individually and together, the four Centres aim to:

- work at the speed of business to advance climate change science and solutions that support entrepreneurs, industry, government, and communities to enable decision making that ensures long-term social, economic, and environmental sustainability
- ✓ improve assessment of climate change-related risks and impacts
- ✓ build capacity to support evidence-based decision making to benefit Canada's prosperity
  on all levels
- ✓ improve observation, monitoring, and surveillance networks to build unique climate-related datasets and expand opportunities for new research
- ✓ contribute to Canada's green economy through development of clean technology
- develop as a world-class model for a highly successful integrated living lab that is known for highly collaborative learning, research, and community outreach

Unique to Canada, the Canadian Centre for Climate Change and Adaptation will provide a hub for collaborative climate change learning, research, and innovation in a living laboratory setting.

Knowledge capacity and transfer from research initiatives and universities to industry is vital to enhancing competitiveness in all sectors of the economy. Industry's thirst for new knowledge has resulted in a greater need for partnership and collaboration between universities and companies, not only in Atlantic Canada, but across the globe. These partnerships require much more than a simple exchange of knowledge for funding. The strategic partnerships must share similar core values and have a vested interest in realizing synergies for the mutual benefit of all parties.

UPEI has set an impressive precedent for industry-university partnerships with the establishment of the UPEI School of Sustainable Design Engineering. Despite the young age of the Sustainable Design Engineering School, we are already seeing the benefits of these partnerships, including the ability for students and researchers to work with local companies to solve real problems. At the same time, companies are using the partnerships to innovate and advance their industry competitiveness.

UPEI will look to build on the momentum of its School of Sustainable Design Engineering, along with the outstanding efforts of the globally-recognized UPEI Climate Research Lab, to take a similar industry-university partnership approach to academics and research at the new Canadian Centre for Climate Change and Adaptation, with an Innovation Collaboration Space (ICS) as part of its key infrastructure and programming. The Innovation Collaboration Space will be an outstanding resource for organizations from a variety of industry sources to conduct business and research in full cooperation with researchers, as well as students and faculty.

This unique approach leverages UPEI applied climate change programming, networks, and research to create a self sufficient Innovation Collaboration Space that aims to operate solely on the financial investment of private companies, industry associations and tuition.

The Canadian Centre for Climate Change and Adaptation and the Research Centres of Excellence will be industry focused to help the PEI and Atlantic region's economy to react and adapt to the impacts of climate change. By establishing an atmosphere where academics and industry converge, the sharing of knowledge and technology from both sectors will make UPEI and the region a leader in academic and industrial research as it pertains to climate change and adaptation.

The Canadian Centre for Climate Change and Adaptation and the four Research Centres of Excellence will benefit local, regional, and international industries, including the agriculture and aquaculture sectors, and technology companies working to develop products that will further advance the study of climate change and adaptation (such as drone technology manufacturers).

# THE CANADIAN CENTRE FOR CLIMATE CHANGE AND ADAPTATION CENTRES OF RESEARCH EXCELLENCE

Cantra for

Data and Policy Analysis for Transition to Low-Carbon Economies

Centre for

**Coastal Systems Impacts** 

Centralor

Clean Technology Innovation in Support of Agriculture and Aquaculture

Centre for

Climate Change and Human Health

Assessment modelling forecasting

Risk management, mitigation, adaptation

Scalable, accessible, adoptable climate solutions

Support for informed, well-aligned policy decisions

Development and proof of concept testing for clean technologies

New knowledge to benefit industry and community climate change-adaptation efforts

Evidence-based decision making for long-term economic, industry, and environmental sustainability

# SUPPORTED BY HIGH QUALITY HIGHER LEARNING PROGRAMMING

Bachelor of Science (Applied Climate Change and Adaptation)
Bachelor of Science (Sustainable Design Engineering)
Master of Science (Sustainable Design Engineering)
Master of Science (Climate Change and Adaptation)\*
Master of Applied Health Services Research
PhD (Environmental Sciences)
PhD (Sustainable Design Engineering)\*

\*In development

# A DESTINATION FOR COLLABORATIVE SUCCESS

The site of the proposed Canadian Centre for Climate Change and Adaptation has been purposely chosen to ensure proximity to ecosystems and coastal systems relevant to climate research, science, and monitoring programs.

Of particular benefit is the close access to protected areas within Parks Canada's National Park at Greenwich, PEI. Greenwich is home to an extensive and fragile coastal dune system, wetlands and various natural habitats in which numerous rare plant species are found.

One of the most spectacular natural characteristics at Greenwich is the unusually large and mobile parabolic dunes with their associated counter ridges. This phenomenon is very rare in North America. Greenwich is also noted for its cultural and historic assets, such as the archaeological digs conducted between 1983 and 2002 that have found traces left by early Aboriginal peoples, the Mi'kmaq, French and Acadian settlers, and Scottish, Irish, and English immigrants.

UPEI has a strong established partnership with Parks Canada at Greenwich. UPEI students and researchers have already worked to establish a truly unique 'living laboratory' environment in which numerous UPEI and Parks Canada research and monitoring projects related to wildlife, sustainable design engineering, climate change, and biology are underway.



Prince Edward Island National Park at Greenwich



# DATA AND POLICY ANALYSIS FOR TRANSITION TO LOW-CARBON ECONOMIES

The Canadian Climate Change and Adaptation Centre of Excellence for Data and Policy Analysis for Transition to Low-Carbon Economies will focus on expert analysis of data and policies, as well as collaborative research, to better understand how Canada can achieve the required transition to a low-carbon economy in a sustainable and economically viable manner.

The transition to a low-carbon emission energy system in Canada is now underway. But further cost reductions for low-carbon energy systems are expected and ultimately, the emergence of novel technological solutions.

### **EXPERTISE**

Climate change impacts all economic sectors and overall quality of life. "In Canada alone, it has been estimated that, in the absence of action to address global warming, [the country] will face annual costs of between \$21 billion and \$43 billion by the 2050s." (Timothy Lane, Deputy Governor of the Bank of Canada, Finance and Sustainability Initiative, 2 March 2017)

Changes made in response to—or in anticipation of—climate change required responsible, evidence-based decision making. Just as climate change and its impacts are complex, the processes of collecting, analyzing, and interpreting data capable of identifying climate change priorities and guiding cost-effective decisions for the long-term, are also complicated.

Through this Centre, the Canadian Centre for Climate Change and Adaptation will provide multidisciplinary expertise in areas such as Economics, Data Analytics, Actuarial Sciences, Climate Change, Political Science, Sustainable Design Engineering, and Environmental Studies. Centre experts will analyze data and the effectiveness of economic and government policies needed to guide Canada's transition to a low-carbon economy. In addition, the Centre's researchers will provide government, industry, and communities with demonstrations of renewable energy projects at differing scales, and conduct field projects to study effectiveness of new economic policies.

The Centre for Data and Policy Analysis for Transition to Low-Carbon Economies is a collaborative centre of research and knowledge transfer. The Centre aims to continuously develop and make accessible to others, highly-relevant data collections on climate change that do not exist elsewhere. Through multidisciplinary expertise and collaborations, these collections will enable unprecedented capabilities for data analytics and modeling needed to identify, forecast, and mitigate risks associated with transition to low-carbon economies.

In addition to high-calibre undergraduate and graduate students, post-doctoral fellows, and researchers from UPEI, the Centre will encourage participation by multi-institutional and government research partners, visiting scholars, and experts to foster new knowledge that leads to applied research opportunities and, ultimately, benefits to communities. Industry partners will play an exciting role in building data sets for economic sectors.

Through research partnerships, niche research seminars, and workshops, the Centre aims to be a global destination for those eager to collaborate on new ideas, data collection, and use of valuable data to build capacity needed to make evidence-based decisions that better inform economic and environmentally sustainable goals within low-carbon economics.

### SCOPE OF RESEARCH AND COLLABORATIVE INTERESTS

The scope of research and collaborative interests within the Centre include, but are not limited to:

- ✓ economic assessment of climate change policies;
- ✓ development of effective evidence-based policies for responsible long-term social, economic, and environmental sustainability;
- development of risk management frameworks via predictive analytics, risk assessment, and risk modeling to enable best-possible decisions, including:
  - analysis of big data for incremental and holistic economic implications of low-carbon economic shifts;
  - analysis of data to identify climate change and economic priorities; and
  - analysis of data to identify optimization (to enable larger communities, businesses, and households to cost effectively transition to smaller carbon-footprint).

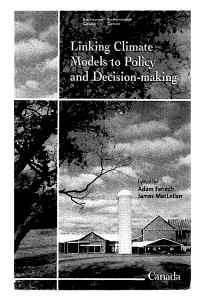
The Centre's scope will make it a destination for global experts eager to participate in research collaborations and workshops for data analytics in relation to economic implications of climate change. This includes providing visiting researchers with access to data collections, infrastructure, and high-quality learning opportunities.

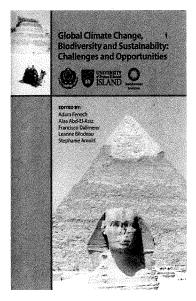
In addition, the Centre will be an unprecedented resource for a wide range of industry partners (including, but not limited to, insurance sector, municipalities, energy sector, tourism sector, and other industries requiring evolved labour market preparedness) to ensure these partners are capable of including climate risk assessments into decision-making processes to support responsible planning and sustained prosperity.

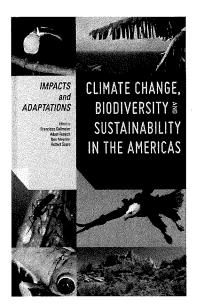
As an advocate for community-engaged scholarships, the Centre will work towards timely knowledge transfer to benefit the economic health and well-being of communities.

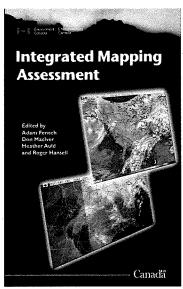
Through the development of innovative programs, UPEI aims to establish the knowledge and physical infrastructure required to build Centres of Research Excellence that encourage global interactions and world-class science in support of climate change and adaptation.

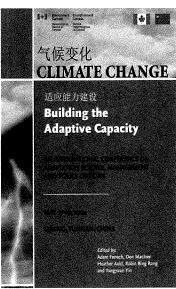
The creation of four centres of climate research excellence in St. Peter's, PEI, is a natural extension of UPEI's strong climate networks that range from Atlantic Canada to Central America and China, providing world-class opportunities to demonstrate the ability of rural areas to define themselves as sustainable global centres of knowledge as thriving living labs.

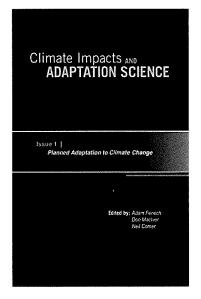














## DATA AND POLICY ANALYSIS FOR TRANSITION TO LOW-CARBON ECONOMIES

RATIONALE: NEW POLICIES AND EMERGENCE OF NOVEL TECHNOLOGIES

Countries around the world have made commitments under the 2015 Paris Agreement to reduce greenhouse gas (GHG) emissions in an effort to avoid potentially dangerous levels of climate change. Scientists have defined 'dangerous levels' when global average temperature increases remain "well below 2°C above pre-industrial levels and the need to pursue efforts to limit temperature increase to 1.5°C".

The transition to a low-carbon emission energy system in Canada is now underway. Coal is being phased out from electricity generation and mechanisms for pricing the carbon content of GHG emissions will be in place across the country by 2018. There remain many challenges and opportunities in achieving a low-carbon energy transition that will create jobs and build more sustainable, livable, and equitable communities.

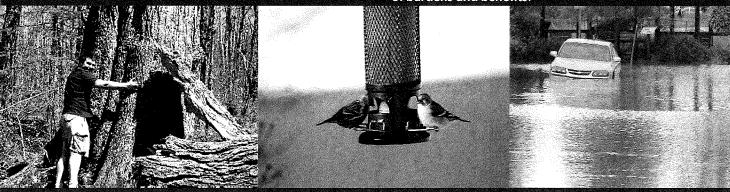
Today, the bulk of Canada's energy needs are being met by fossil fuels. Yet the GHGs released by fossil fuel combustion are driving climate change. Existing international agreements suggest an 80% reduction of GHG emissions will be required by mid-century in industrialized countries. Due to the difficulty of reducing emissions in agriculture, specific industrial processes, and other sectors, this implies the virtual elimination of GHG-emitting sources

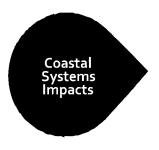
from the energy mix over the next 30 to 40 years. Such a transformation of the way humans produce and consume energy will not be easy.

Other ways to produce energy include hydro, nuclear and other established alternatives, as well as newer renewables such as wind, solar, biomass, and geothermal. Technological innovation is ongoing and over coming decades, further cost reductions for low-carbon energy systems and the emergence of novel technological solutions are expected.

Economic analyses suggest the aggregate costs of a transition to low-carbon energy systems will not be ruinous. The obstacles to movement are not primarily technical or economic, but rather related to social and political factors — locally, regionally, nationally, and internationally. Established ways of doing things are deeply entrenched.

In Canada, tens of thousands of jobs, the viability of many business ventures and the tax revenues of governments are tied up with the fossil fuel industry. Of course, low-carbon energy also offers tremendous economic opportunities. A judicious policy approach will be required to shift local, regional, national, and international cultures and economies and in a manner that will ensure a fair distribution of burdens and benefits.





# **COASTAL SYSTEMS IMPACTS**

The proposed Coastal Systems Impact Research Centre of Excellence will focus on expanding UPEI's existing expertise in climate change vulnerability, impacts, and adaptation, while developing new strengths in ocean acidification research. The Centre will provide knowledge needed to clearly define priorities associated with coastal impacts and ocean acidification, providing decision makers with information and tools to optimize adaptation strategies.

Coastal erosion is expected to continue and likely become more severe, **threatening public** and private infrastructure at great economic cost. Greater knowledge of coastal impacts, and appropriate mitigation and adaptation strategies are needed to support Prince Edward Island and other coastal areas across Canada and around the world.

### **EXPERTISE**

# **EXISTING EXPERTISE: COASTAL SYSTEMS IMPACTS**

Coastal erosion and coastal infrastructure impacts due to storm surges, wave forcing, and sea-level rise are perhaps the greatest climate-related challenges for Prince Edward Island. However, these impacts are not isolated to PEI. The immediate need to better analyze, model, and forecast coastal systems impacts is a challenge shared on a global level.

Due to anticipated ocean, geological, and storm population, coastal erosion is expected to continue and likely intensify, threatening public and private infrastructure at significant economic and cultural costs. PEI's precarious sensitivity to erosion is a troubling reality for the province's population. This sensitivity, combined with the unique expertise of the Centre for Coastal Systems Impacts, makes PEI a model system for assessing and developing adaptation approaches for coastlines around the world.

The expertise of the Centre focuses on collaborative research and community outreach, as well as the development of innovative tools to advance the science of coastal system visualization, assessment, modelling, and forecasting. The UPEI Climate Research Lab's MIT-award-winning-tool (Coastal Impacts Visualization Environment [CLIVE]) for visualizing coastal erosion and sea-level rise has achieved global attention, including the interest of 40 Stanford University researchers who will visit UPEI in September 2017. This innovation will be further developed through the Centre to include realistic infrastructure.

Through collaboration with UPEI partners—including the UPEI Climate Research Lab, UPEI Canada Excellence Research Chair, UPEI Biology, the UPEI School of Sustainable Design Engineering, and the UPEI School of Mathematical and Computational Sciences—and various external partners, the Centre for Coastal Systems Impacts aims to customize applied research into potential commercialized changes, products, services, and innovation tools. The development of advanced drone technology for visualization of coastal vulnerabilities is a key example. Another example is advancing technology that will enable a new level of accurate and affordable measurement of localized wave action across entire coastlines.

As wave strength is a major determinant of coastal erosion, Centre activities will provide enhanced accuracy for coastal erosion forecasts for adaptation decisions, including assessing proposed coastal erosion protection systems.

# EMERGING EXPERTISE: OCEAN ACIDIFICATION

Increased carbon emissions and their absorption by ocean waters have triggered a gradual but unprecedented acidification of oceanic and coastal waters (Wootton et al., 2008). A significant gap in scientific knowledge currently exists in relation to ocean acidification in waters surrounding PEI.

The Centre for Coastal Systems Impacts aims to develop a research focus on acidification and the lowering of water pH in PEI waters. This will enable the Centre to understand the resulting impacts that directly threaten creatures and habitats dependent on calcium carbonate to build their shells, carapaces, or skeletons—in essence the chain from micro-algae to familiar species such as oysters, mussels, urchins, crabs, and lobsters.

It is recognized that negative effects of ocean acidification on species and the integrity of natural habitats will irremediably pass onto services and resources (Cooley et al., 2009). In an effort to identify and mitigate risks, the Centre will promote research collaborations to predict impacts to industries (such as commercial fisheries, aquaculture, and tourism) as well as broader anticipated impacts to food security, shoreline prosperity and community well-being of PEI, Atlantic Canada, and coastal regions around the world.

The Canadian Climate Forum, in its 2017 spring issue, highlighted the synergy between ocean acidification and sea-level rising, suggesting that PEI is likely the most vulnerable province in eastern Canada. Given its size, location, and close ties to coastal resources, Prince Edward Island is arguable one of the most ideal locations for the study of ocean acidification and its synergy with other components of climate change.

# SCOPE OF RESEARCH AND COLLABORATIVE INTERESTS

- Creation of dynamic models and development of protocols that are readily available for rapid assessment and forecasting in Atlantic Canada and other regions to support effective decision making, adaptive strategies, and policy development.
- ✓ Identification of key species and life stages impacted by ocean acidification for monitoring and forecasting in the Atlantic region to inform industry and government.
- Assessment of the influence on coastal systems impacts and ocean acidification on resources and industries and development of time scales (e.g., anticipated impacts in 2030, 2050, etc.) relevant to industry and government.
- Partnering with First Nations groups to examine vulnerable ancestral lands and adaptation measures to protect culturally significant areas.
- ✓ Promotion of collaborative research to advance new knowledge in synergistic areas of climate change and ocean acidification.

- ✓ Development and/or testing of commercialized products and services with local and global applications (including, but not limited to development of novel drone technology for coastal visualization, distributed wave sensing, precision instrumentation, wave tank testing, and full-scale monitoring to test coastal protection options).
- ✓ Partner with industry and government to prioritize adaptation measures through collaboration and timely knowledge transfer.
- ✓ Support timely advances in health, safety, and emergency measures through community engagement and partnerships.

The Centre's scope will make it a destination for global experts eager to participate in research collaborations and workshops in relation to coastal systems impacts and ocean acidification. This includes providing visiting researchers with access to high-quality datasets, research infrastructure, innovative technology, commercialized product development and testing, and high-quality learning opportunities. In addition, the Centre will be an unprecedented resource for a wide range of government, industry, and community partners who need to include climate risk assessments in their decision-making processes in order to support responsible planning and sustained prosperity.

As an advocate for community-engaged scholarship, the Centre will work towards timely knowledge transfer of benefit to the economic health, cultural sustainability, and well-being of communities.

# Indigenous Canadians face a crisis as climate change eats away island home

Rising sea levels mean that Lennox Island has lost more than 400 acres in just a few generations. Now its First Nations community wonders if it has a future.



The Guardian.com/world (UK)

Ashifa Kassam on Lennox Island Wednesday 18 January 2017 09.00 GMT

An aerial view of Lennox Island, off the coast of Prince Edward Island in eastern Canada. "We're losing our island," said one resident. (Photograph: The Government of Prince Edward Island)

## THE GLOBE AND MAIL

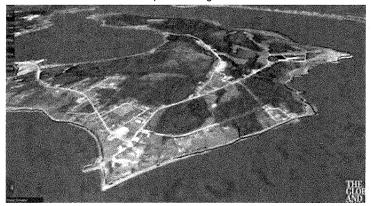
JANE TABER, FEBRUARY 19, 2014

# Erosion swallowing up PEI at rate of 28 centimetres a year

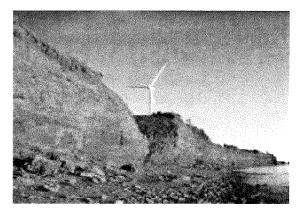
"Prince Edward Island is shrinking. The sea is swallowing up its ruby-red sandstone cliffs and coveted sandy beaches at a rate of 28 centimetres a year, and an estimated \$150-million in real estate is in danger of disappearing over the next 90 years, along with several of the island's prized golf courses and a wind turbine...

CLIVE – Coastal Impact Visualization Environment – is the product of a pan-Canadian collaboration which uses the guts of a 3-D game engine and controllers to allow the user to fly over a 3-D map of the island and raise and lower the level of the sea along the 1,260-kilometre coastline. So realistic is it that, at a recent public presentation, it drew gasps from islanders who saw their homes and cottages vanish..."

Full article available at https://beta.theglobeandmail.com/news/national/smallest-province-gettingsmaller/article16988070/?ref=http://www.theglobeandmail.com&



UPEI Climate Research Lab Coastal Erosion Visualization Tool



CBC July 26, 2016 (Photo credit: Province of PEI)

### **COASTAL SYSTEMS IMPACTS**

RATIONALE: GREATER KNOWLEDGE IN COASTAL IMPACTS, MITIGATION AND ADAPTATION

National Resources Canada's 2016 Canada's Marine Coasts in a Changing Climate was developed based on collaboration among government, industry, and professional organizations to identify adaptation priorities.

The document describes climate change impacts on the East Coast of Canada including that sea levels will rise, sea ice will decrease, and future coastal-erosion rates will likely increase in most areas. Prince Edward Island and other small islands are at the forefront of the impacts of climate change.

The primary challenge that climate change presents to Prince Edward Island is the impact of coastal erosion through storm surges and high water levels. The sensitive sand and sandstone shorelines across the province often experience erosion by water, waves, ice, and wind.

Sea level rise has been measured at Charlottetown, PEI to have increased by 36 centimetres over the past 100 years (1911-2011 from R.J. Daigle Enviro Consultant, 2012), and is anticipated to increase by a further 100 centimetres over the next 100 years (Intergovernmental Panel on Climate Change IPCC, 2013).

At the same time, crustal movement of the Earth's surface at Prince Edward Island is

lowering at 10 to 20 centimetres per century (Daigle, 2012) depending on the geographic area of the Island, which causes some concern about coastal erosion.

In terms of damaging storms, the Intergovernmental Panel on Climate Change (IPCC), the global community's scientific authority on climate matters, concluded that they were "virtually certain" that there had been an increase in intense tropical cyclone activity in the North Atlantic since the 1970s; and "more likely than not" that these intense tropical cyclones would increase in the North Atlantic in the late 21st Century (IPCC, 2013).

As a result of these anticipated ocean, geological and storm changes, coastal erosion is expected to continue and likely become more severe, threatening public and private infrastructure at great economic cost to the 3,295 kilometres of coastline on Prince Edward Island. In addition to the vulnerability of communities, tourism is often an economic generator of coastal communities.

Greater knowledge of coastal impacts, and appropriate mitigation and adaptation strategies are needed to support Prince Edward Island and other coastal areas across Canada and around the world.





# CLEANTECHNOLOGY INNOVATION IN SUPPORT OF AGRICULTURE AND AQUACULTURE

Through a highly-collaborative approach, research carried out by the Clean Technology Innovation in Support of Agriculture and Aquaculture will bridge the analysis of land- and water-based farming processes and practices with advancements in clean technology.

The approach and research focus serves to provide solutions to strengthen Canada's agriculture and aquaculture sectors in the face of climate change. The Centre pursues application and integration of existing technologies as well as the creation of novel clean technologies with the goal of enabling systems that are more robust, easily adopted, economical, and sustainable.

# **EXPERTISE**

Agriculture and aquaculture are major contributors to Canada's economy and identity. Together, these industries are responsible for creating significant wealth, jobs, and trusted food products for Canadians. Both industries generate significant greenhouse gas emissions and, symbolically, are highly sensitive to the effects of climate change. Climate, energy systems, ecosystems, and the activities of agriculture and aquaculture intersect and impact each other in highly complex ways making it difficult to predict and adapt to ongoing changes. As a result, it is challenging to make investment decisions and well-aligned policies to support the long-term sustainability of these sectors and the environment.

The Centre for Clean Technology Innovation in Support of Agriculture and Aquaculture brings together a world-class, multidisciplinary team of researchers and academics who work alongside industry partners and global research networks on a daily basis.

The intersecting specializations within the research cluster provide exiting new opportunities to advance science and applied knowledge in clean technologies and sustainable practices for agriculture and aquaculture.

Centre expertise includes researchers from the UPEI Centre for Veterinary Epidemiological Research (considered the world leader in its field of research), the UPEI Canada Excellence Research Chair in Aquatic Epidemiology, the UPEI School of Sustainable Design Engineering, the UPEI School of Mathematical and Computational Sciences, the globally-recognized UPEI Climate Research Lab, and UPEI Faculty of Science researchers from Environmental Studies, Foods and Nutrition, Chemistry, and Biology.

Centre expertise ranges from aquatic/livestock health management and data analytics, to renewable energy biosensor technology development. As a result, the Centre for Clean Technology Innovation in Support of Agriculture and Aquaculture is capable of providing new knowledge to inform farming practices from both technology and ecology standpoints to reduce environmental impacts, enhance production, and support long-term sustainability.

This knowledge equips those on the front lines of farming and environmental stewardship with the best strategies for a changing climate, and better informs commercial and regulatory decision makers. Focus areas within the Centre include, but are not limited to:

- ✓ creation of comprehensive energy flow maps to identify and rank leverage points for emissions mitigation and adaptation strategies to improve the sustainability of land- and water-based farming operations;
- design and development of scalable agriculture and aquaculture pilot projects demonstrating optimized application of clean technology solutions; and
- ✓ the development of bio-sensing technologies to help keep land, water, and air healthy to sustain farming and livelihoods.

The Centre's strengths in bio-sensing technology development has considerable potential to lead to outcomes in enabling real-time environmental, crop, and animal monitoring to enhance farm productivity and assist farmers in short- and long-term decision making for the sustainable management of their farms and livestock. This clean technology is also capable of providing real-time data for provincial and federal policy makers regarding impacts of industry practices on climate change on farming practices.

The Centre's strengths in bioresources and sustainable energy bring complementary potential to improve farm operations at the process and energy system level to improve energy efficiency and identify new revenue opportunities. Possibilities include reducing energy costs and emissions through clean energy technologies, improving process efficiency through multidisciplinary system optimization, and enabling new by-product revenue streams through novel bioconversion processes.

## SCOPE OF RESEARCH AND COLLABORATIVE INTERESTS

- ✓ Assessment, analysis, and modeling of farm inputs, outputs, and processes to determine opportunities for decarbonisation efficiency improvement, by-product synergies, diversification of farming, and more adaptive and optimized farming methods.
- ✓ Evaluate, adapt, and develop clean technologies to monitor and improve farm processes (land- or water-based) to mitigate greenhouse gas emissions.
- ✓ Incubation and development of new clean technologies (including smart/real-time monitoring devices, precision instrumentation, bioconversion processes, and clean energy solutions) that are relevant, scalable, accessible, and easily adopted by a wide range of users.
- ✓ Support development of innovative biosensor technology by internal and external research partners through Atlantic Canada's only clean-room facility.
- ✓ Develop best practices for sustainability and retrofits of existing farm systems.
- ✓ Analysis of alternative crops, including low-cost, low-maintenance bio-energy crops.
- ✓ Support policy development for sustainable agriculture and aquaculture practice that enable transition to a low-carbon economy.
- ✓ Provide leading-edge HQP training and research opportunities for the next generation of agriculture, aquaculture and climate researchers.

# CLEAN TECHNOLOGY INNOVATION IN SUPPORT OF AGRICULTURE AND AQUACULTURE

RATIONALE: NEW TECHNOLOGIES TO REDUCE GHG EMISSIONS AND CLIMATE IMPACT

Agriculture and agri-food is a significant contributor to the Canadian economy, accounting for 6.6% of national gross domestic product (GDP) in 2014 (and more than 11% of the provincial gross domestic product in Canada). However, the industry is heavily reliant on fossil fuels for energy production and is responsible for more than 10% of Canada's greenhouse gas (GHG) emissions (Agriculture and Agri-Food Canada).

A unified effort by the farming community can facilitate a shift in production processes to achieve reductions in energy consumption and GHG emissions. Increasing energy efficiency on farm operations can improve overall profitability and reduce exposure to volatile energy prices.

Aquaculture represents about a third of Canada's total fisheries value and is divided between the Pacific and Atlantic coasts. In 2013, British Columbia accounted for almost half of the total production, followed by Newfoundland and Labrador and Prince Edward Island (15% each), New Brunswick (11%) and Nova Scotia (5%) (Department of Fisheries and Ocean).

The aquaculture industry generated more than \$1 billion in GDP in Canada in 2010 and employed 14,000 in full-time, well paying jobs that are primarily located in smaller coastal and rural communities. For aquaculture, primary greenhouse gas emissions come from the feed production stage and, therefore, GHG emissions can be improved through differing feed formulations, levels of intensification, and food conversion ratios. Measures to reduce emissions could be found in other areas of the production and supply chain system.

Canada's agriculture and aquaculture industries are highly sensitive to climate change. The impacts of climate change and a rising average global temperature can pose significant challenges for both industries. While benefiting from longer growing seasons and more frost-free days, Canada's agriculture industry will face more crop pests and disease. Canada's aquaculture industry may benefit from warmer water temperatures; however, there will be more pests and disease to combat.

Innovation and clean technology development are needed to reduce the impact of GHG emissions and climate change on important provincial, regional and national economic sectors.



#### CLIMATE CHANGE AND HUMAN HEALTH



By collecting markers of human health and correlating these with environmental parameters, the **Centre for Research Excellence in Climate Change and Human Health** will develop unique datasets to assess how climate change is affecting populations and, through modeling and forecasting, how climate-related health impacts may occur in the future. The Centre's datasets will provide information to internal and external researchers for the purpose of scientific study, decision making, and development of innovative devices for use in monitoring and protecting health.

#### **EXPERTISE**

All Canadians are vulnerable to the health impacts associated with climate change. Observations have been made of the following human health impacts: climate-related increases in exposure to elevated temperatures; more frequent, severe, or longer-lasting extreme precipitation events such as droughts or flooding; degraded air quality; diseases transmitted through food, water, and disease vectors (such as ticks and mosquitoes); and, stresses to mental health and well-being. Increased exposure to multiple health threats, together with changes in sensitivity and the ability to adapt to those threats, increases a person's vulnerability to climate-related health impacts. Social determinants of health infrastructure intensify the magnitude of climate change impact on health of populations.

The U.S. Global Change Research Program study *TheImpacts of Climate Change on Human Health in the United States: A Scientific Assessment* indicates that "while often assessed individually, exposure to multiple climate-change threats can occur simultaneously, resulting in compounding or cascading health impacts." (SGCRP, 2016: *The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment*. Crimmins, A., J. Balbus, J.L. Gamble, C.B. Beard, J.E. Bell, D. Dodgen, R.J. Eisen, N. Fann, M.D. Hawkins, S.C. Herring, L. Jantarasami, D.M. Mills, S. Saha, M.C. Sarofim, J. Trtanj, and L. Zisk, Eds. U.S. Global Change Research Program, Washington, DC, 312 pp. http://dx.doi.org/10.7930/JoR49NOX) While scientists are becoming more aware of the impacts of climate change on many existing health risks, further study is needed to better understand new health challenges that will occur due to climate change.

UPEI's Centre for Climate Change and Human Health focuses on data collection, analysis, interpretation, modeling, and forecasting of risks to human health. Together these activities provide valuable information to manage existing, and plan for future, health impacts of climate change, and contribute to the development of new technologies for real-time health monitoring.

UPEI experts in data analytics, biostatistics, epidemiology, sustainable design engineering, climate change, and health work together in the UPEI-based Centre for Climate Change and Human Health to determine climate change influences on human health and the best way to prevent or minimize negative health outcomes.

The Centre will leverage existing skills and expertise at UPEI including:

- the Centre for Health and Community Research (CHCR) (which is mandated to advance research, education, and knowledge within the fields of health and bioscience) and is home to the Secure Island Data Repository (SIDR) of administration health data on the UPEI campus, and
- the Chair in Human Development and Health and other human health experts within the UPEI School of Nursing, the Atlantic Veterinary College, UPEI Applied Human Sciences, UPEI Biology, the UPEI School of Sustainable Design Engineering, and UPEI School of Mathematical and Computational Sciences.

UPEI will attract additional researchers and experts from around the world during its October 2017 international symposium on *Climate Change and Human Health: A Global Challenge and Local Concern.* 

Working with highly qualified personnel, external research partners, health networks, and community partners, UPEI's strengths in health research are leveraged through the Centre to build unique and dynamic datasets within a secure data repository. Data can be accessed through physical and virtual environments to provide valuable information across cohorts and health conditions to identify climate change impacts on health. To reduce health inequities, the Centre will provide comparative data on health indicators for various populations, including First Nations communities. The Centre's ability to collect and measure biomarkers and other health indicators over time provides researchers and decision makers with critical data that can assist in developing new technology and policies to support population health and healthy adaptation to the effects of climate change.

Additionally, the Centre's comprehensive datasets provide evidence to build tools and apply these tools for the purpose of monitoring health. Medical biosensors, including point-of-care devices, are capable of monitoring a person's health in real time. These tools allow for testing health parameters anywhere, including remote or isolated locations. The devices bring data directly to researchers without the need for on-site personnel thus establishing a virtual system and reducing overall costs and burden.

Scientific models saved lives from Harvey and Irma. They can from climate change too

Climate models have an even better track record than the weather models that saved lives in Texas and Florida (The Guardian, UK edition, September 18 2017)



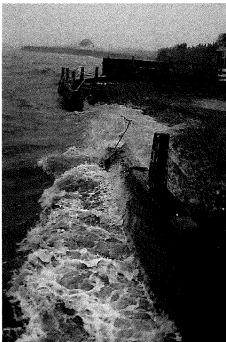
Traffic on the northbound lanes of Florida's Turnpike on Friday, Sept. 8, 2017, as motorists evacuated for the anticipated arrival of Hurricane Irma. (Photograph: Stephen M. Dowell/AP)

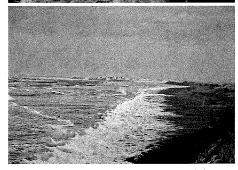
Through its integrated focus on high quality data and real-time monitoring, the Centre will create an infrastructure to help build expertise in climate change and its impact on human health. The Centre's commitment to collaborative research and training will further support industry potential in this area by optimizing capabilities to develop data and health specialists for future jobs and, to aid in stemming the outmigration of high quality personnel.

## SCOPE OF RESEARCH AND COLLABORATIVE INTERESTS

- Optimize a secure data repository to support researchers in their quest to advance knowledge of escalating climate change influences on health.
- Build unique and dynamic datasets to support research and decision making by means of data analysis, modeling, and forecasting through with risk assessments can be determined.
- Identify climate change related risks to human health with an emphasis on populations that are disproportionately vulnerable to climate impacts.
- Provide comparative data on health indicators to support communities disproportionately impacted by climate change to close the gap in health inequities.
- ✓ Through access to data, develop and apply/utilize tools (such as monitoring devices) that collect and mine relevant health data.
- Develop infrastructure for intersecting areas of data science, health analytics, and data visualization, including knowledge and skills expertise for data/health careers of the future.
- Provide data to support evidence-based decision making and policies in relation to health and climate change.







#### **CLIMATE CHANGE AND HUMAN HEALTH**

RATIONALE: EVALUATION, MONITORING AND PROJECTING IMPACTS AND ADAPTATION STRATEGIES

All Canadians are vulnerable to the health impacts associated with climate change. Observations of human health impacts have been made of climate-related increases in exposure to elevated temperatures; and more frequent, severe, or longer-lasting extreme precipitation events such as droughts or flooding; and degraded air quality. Other impacts include diseases transmitted through food, water, and disease carriers such as mosquitos and ticks and other stresses to human mental health and well-being.

Increased exposure to multiple health threats, together with changes in sensitivity and the ability to adapt to those threats, increases a person's vulnerability to climate-related health effects. The impacts of climate change on human health interact with underlying health, demographic, and socioeconomic factors. Through the combined influence of these factors, climate change exacerbates some existing health threats and creates new public health challenges.

While all Canadians are at risk, some populations are disproportionately vulnerable to these risks including those with low income, immigrant groups (especially those with limited English proficiency), children and pregnant women, older adults, vulnerable occupational groups, persons with disabilities, and persons with pre-existing or chronic

medical conditions. Perhaps most vulnerable are Canada's First Nations people due to their close connection to nature, an environment under constant transformation with climate change. Canada's First Nations social, economic, spiritual lifestyles and overall health are all impacted heavily, and disproportionately, to climate change.

In recent years, scientific understanding of how climate change increases risks to human health has advanced significantly. Even so, the ability to evaluate, monitor, and project human health effects varies across climate impacts. For instance, information on health outcomes differ in terms of whether complete, long-term datasets exist that allow quantification of observed changes, and whether existing models can project impacts at the time and geographic scales of interest. Differences also exist in the metrics available for observing or projecting different health impacts. For some health impacts, the available metrics only describe changes in risk of exposure, while for others, metrics describe changes in actual health outcomes.

Greater understanding of the impact of climate change on human health is critical to better identify preventive and adaptive actions in the face of growing projected climate change threats.







## 3.0 CLIMATE CHANGE AND ADAPTATION HIGHER LEARNING PROGRAMMING WITHIN THE CANADIAN CENTRE FOR CLIMATE CHANGE AND ADAPTATION

## EDUCATING AND EQUIPPING THE NEXT GENERATION OF CLIMATE LEADERS WITH CRITICAL KNOWLEDGE AND SKILLS

Within the proposed Canadian Centre for Climate Change and Adaptation UPEI's Department of Science and School of Graduate Studies will deliver highly innovative and relevant programming a Bachelor of Science in Applied Climate Change and Adaptation and a Master of Science in Climate Change and Adaptation.

Approved by the UPEI Board of Governors, UPEI Senate, and Maritime Provinces Higher Education Commission (the regional authority for post-secondary programming quality assurance), UPEI's new Bachelor of Science in Applied Climate Change and Adaptation will examine theoretical aspects of how science, policy, and human populations interact in creating and solving climate change challenges, while engaging students in hands-on, technology-based learning.

The UPEI Bachelor of Science in Applied Climate Change and Adaptation is purposely innovative in design and delivery. In keeping with priorities outlined within the UPEI Strategic Plan and UPEI Academic Plan, the program strongly aligns with UPEI's vision to be a leader in experiential learning opportunities that encourage students to develop to their full potential in both the classroom and the community.

To make it unique to the region and country, UPEI brought together best practices of other successful climate programs throughout North America and Europe. The University also considered recent evidence-based results of the MPHEC Class of 2012 Maritime University Graduates: Pathways to Employments urvey.

This survey shows strong progression of graduates from Applied Arts and Sciences and Professional programs moving directly into the workforce after graduation. In addition, graduates of this group have demonstrated strong interest in pursuing a second credential or further studies—most notably, graduate studies.

The main objectives of the program include: developing climate leaders who understand essential biological and physical sciences and their processes in relation to climate; understand the broader social and economic policy implications of climate change; possess analytic skills that enable them to interpret, understand, and predict climate impacts and climate models; develop critical thinking skills to effectively evaluate evidence and processes, and make sound decisions on adapting to climate change; and continually develop their teambuilding, communication, and digital literacy skills that enable them to effectively collaborate and communicate.

The result is a program that will examine theoretical aspects of how science, policy, and human populations interact in creating and solving climate change challenges, while engaging students in hands-on, technology-based learning in an experiential manner beyond the traditional classroom and textbooks. For example, students will learn to use state-of-the-art drone technology and computer game programming surveillance instrumentation to develop skills to assess the vulnerability, impacts, and adaptation to climate change.

In addition to flying and immersing drones to gather data, students will learn, among other outcomes, to:

- ✓ use GIS to map and visualize climate change;
- ✓ analyze climate change in a way that takes future industry and community impacts real and tangible;
- ✓ design and set up climate stations;
- ✓ participate in United Nations-style climate governance summits; and
- ✓ examine paleoclimatalogical indicators of climate.

Students will further benefit from the program's concentration on hands-on learning and skill development through a high degree of small group exercises/projects, laboratory work, fieldwork, community engagement, and field courses — including two senior level field courses delivered by UPEI's educational and research partner The Smithsonian Institution.

Graduates of the program will have relevant knowledge and skills to compete for a diverse range of career opportunities related to science, social, and policy aspects of climate change in areas ranging from entrepreneur-based businesses to all levels of government. The program will also provide graduates with entry level requirements needed for many professional and graduate programs in related fields, including areas such as climate related science programs, meteorology, policy, law, public administration, data analytics, and more.

## UPEI Climate Change and Adaptation Programming A UNIQUE DELIVERY MODEL

- Applied learning
- Selective domestic and international student recruitment
- Living Laboratory' in rural PEI
- Problem solving with community and industry projects
- Student work-integrated-learning placements with organizations such as Parks Canada and other stakeholders
- International partners and recognition
- Next generation leaders in climate change and adaptation



P.E.I. researchers using drones to fight coastal erosion

CBC News June 23, 2016 Terrence McEachern

Summer work-integrated-learning (WIL) opportunities with industry and government organizations will also differentiate the program. It is UPEI's intention that all students within the program will be employed during two summer WIL sessions, during which students are paid and earn program credits. A number of government and industrial partners have expressed interest in participating in climate-related WIL to advance their respective organizations' objectives while contributing to development of future skilled labour. The real-world experience gained by students will assist them in securing jobs upon graduation. The strength of the program's WIL aspect will aid in employer and community partnerships as it encourages the competencies and networks needed to "...build a highly skilled and productive labour force for an innovative, strong, and growing economy." (Canadian Chamber of Commerce on the benefits of WIL)

UPEI currently delivers an interdisciplinary liberal arts and science Environmental Studies program that offers a broad base of Arts, Science, and Business courses to provide students with the ability to understand environmental connections across fields. UPEI's Bachelor of Science in Applied Climate Change and Adaptation will build increasingly concentrated knowledge and application of fundamental sciences, incorporate new fields of study (such as data analytics focused on climate change, geographic information systems, and climate coastal sciences), and use technologies previously not used within UPEI curriculum, to leverage existing Environmental Studies strengths within the first two years of the new program. This complementary model will serve to build an emerging cluster of expertise at UPEI, and an enhanced level of faculty collaboration across disciplines.

Together, the existing Bachelor of Environmental Studies and new Bachelor of Science in Applied Climate Change and Adaptation will enable UPEI to develop a robust climate-concentrated undergraduate focus that will serve to develop career-ready professionals and a new generation of graduate students with broad environmental awareness and specialization in climate change science.

	LEARNING OUTCOMES FOR BACHELOR OF SCIENCE IN APPLIED CLIMATE CHANGE AND ADAPTATION
CLIMATE SCIENCE	<ul> <li>Physical basis of the natural greenhouse effect, and the human contribution to it</li> <li>How astronomical forces influence the earth's climate and their cycles</li> <li>Physical and chemical properties of the atmosphere that influence climate including the role of the cryosphere, oceans, land processes, etc.</li> <li>Greenhouse gases: their global warming potential, chemical make-up, and sources; quantify the human contributions globally, nationally, and provincially</li> <li>Paleological indicators of climate including ice cores, tree rings, sediment cores, etc.; how these indicators are collected; and what they tell us about past temperature changes</li> </ul>
CLIMATE OBSERVATIONS	<ul> <li>How the components of climate are monitored instrumentally including temperature, precipitation in its many forms, wind, solar radiation, atmospheric pressure, humidity, etc.</li> <li>History of written climate archives, how observations were collected, how they are digitized, then input several pages into climate dataset</li> <li>Databases, how they are organized, software available to assist, how climate records are organized</li> <li>Plan and execute setting up climate station that reports to a UPEI database</li> <li>Online climate records and where they are located, download climate records, organize climate records, quality control climate records</li> <li>How to analyze climate trends, calculate climate indices</li> </ul>
SCENARIOS OF FUTURE CLIMATE	<ul> <li>Global climate models, regional climate models, climate model downscaling</li> <li>Representative concentration profiles and future climate scenarios</li> <li>International climate modeling centres and variations of climate models</li> <li>Online GCM output from 50 models, download climate model output, validate climate models against observations</li> <li>Projections of future climate for PEI and other locations around the world</li> <li>Dealing with uncertainty in climate models</li> </ul>
MAPPING AND VISUALIZATION OF CLIMATE CHANGE	<ul> <li>Concepts and operation of a geographic information system (GIS)</li> <li>Mapping of climate zones and climate impact regions</li> <li>Operations of a small unmanned aerial vehicle including rules and regulations, piloting, flight planning, data conversion, data management, sensor availability</li> <li>Visualization of climate change to motivate climate change adaptation</li> </ul>
CLIMATE CHANGE IMPACT AND ASSESSMENT	<ul> <li>Impacts of climate change on all economic and ecological sectors including sensitivity to climate parameters including temperature, precipitation, wind, etc.</li> <li>Impacts of climate change on coastal erosion, sea level and storm surges</li> <li>How to apply international standards for the Climate Change Impact Assessment process</li> <li>Impacts of climate change on flooding; precipitation intensity, duration and frequency curves for return periods; and flooding insurance</li> <li>Dealing with probability in climate impact assessment</li> </ul>
CLIMATE CHANGE MITIGATION AND ADAPTATION	<ul> <li>National GHG contributions focusing on Canada's place in the world and provincial (especially PEI) contributions under a Climate Change Pan-Canadian Framework</li> <li>Methods for reducing GHGs including renewable energy, energy conservation and innovation</li> <li>Inevitability of climate change adaptation, its definitions, classifications, and measurement</li> <li>Climate change adaptation measures across all economic and ecological sectors</li> </ul>

	LEARNING OUTCOMES FOR BACHELOR OF SCIENCE IN APPLIED CLIMATE CHANGE AND ADAPTATION
CLIMATE GOVERNANCE	<ul> <li>United Nations and international climate governance</li> <li>History of international GHG regulation and management leading to the UNFCCC, the Kyoto Protocol, and the Paris Agreement</li> <li>Business risks in an era of climate change including physical, legal, regulatory, reputational, and insurance risks</li> <li>Carbon accounting and measuring your carbon footprint</li> <li>Environmental (climate) management in Canada, and in the provinces (focusing on PEI)</li> </ul>
CLIMATE CHANGE AND SOCIETY	<ul> <li>Implications of climate change on migration patterns</li> <li>Understanding cross-societal impacts of climate change (rural vs. urban, developing vs. developed countries)</li> <li>Effects of climate change and adaptation upon traditional cultures, groups, and societies</li> <li>Climate change, food security, and resource depletion</li> </ul>
CLIMATE CHANGE AND INDIGENOUS CULTURE	<ul> <li>Implications of climate change and adaptive strategies for Indigenous communities across different jurisdictions</li> <li>Effects of climate change upon treaty processes and land claims</li> <li>Responding to changes in Indigenous ways of life and implications for future policy-making and decision-making</li> </ul>
CLIMATE POLICY	<ul> <li>Strategies for communication and dissemination of scientific data to a general audience</li> <li>Understanding how government policies are formulated in the context of theories of policy decision-making</li> <li>Understanding factors that determine government willingness to formulate climate related policies</li> <li>Understanding and evaluating climate change policy within the context of international relations and governance</li> <li>Understanding history of climate change policy</li> <li>Multilateral vs. bilateral agreements</li> </ul>
ECONOMICS OF CLIMATE CHANGE	<ul> <li>Effects of increased storms and disaster management</li> <li>Understanding and planning for compensation (international, regional, and local)</li> <li>Economic development, adaptation</li> <li>Challenges for budgeting models and projections</li> </ul>
CLIMATE CHANGE AND HUMAN BEHAVIOUR	<ul> <li>Psychology of denial and trauma</li> <li>Ethics and morality related to uneven effects of, and culpability, for climate change</li> <li>Climate change and religion in a cross-cultural context</li> <li>Climate change and the social contract</li> </ul>

#### **UPEI MASTER OF SCIENCE IN CLIMATE CHANGE AND ADAPTATION**

The UPEI Master of Science in Climate Change and Adaptation (currently in development), is being designed based on best practices of leading climate change programs in North America and Europe. The intent of the one-year program will be to:

- contribute to increasing demand for scientists and professionals who are capable of contributing to climate change solutions within industry, all levels of government, and NGOs via progressive policy development, well-informed decisions, and strong collaborative approaches; and
- build capacity needed for effective evidence-based decision-making, innovation, entrepreneurial start-ups, and solutions needed to advance Canada's clean growth economy.

To expand the reach of its program to working professionals, the UPEI Master of Science in Climate Change and Adaptation will be delivered online to a maximum cohort of twenty students per intake, with an immersive four-week capstone experience onsite at the Canadian Centre for Climate Change and Adaptation. This onsite experience will provide Master students with highly interactive opportunities to engage in fieldwork, further develop technology-based skills, utilize leading-edge research equipment, and build collaborative networks.

The Prime Minister of Canada, the Right Honourable Justin Trudeau, has addressed the need for Canada to do more to address the global challenge of climate change indicating that "...our government is making climate change a top priority [which is] necessary for our collective health, security, and prosperity...".

In pursuing climate change advances, the Government of Canada have established clear objectives and principles of acting based on the best scientific evidence and advice; development and implantation of policies that contribute to a low-carbon economy; the need for individuals to take leadership roles on climate change including community mobilization, innovation, and sharing knowledge with developing countries.

These objectives are only attainable through individuals possessing climate change expertise and the ability to translate that knowledge into effective collaborations with a wide variety of stakeholders.

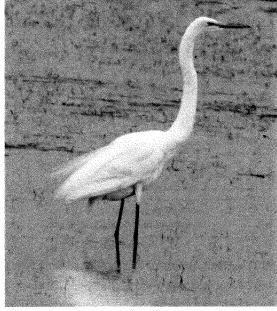
The Province of Prince Edward Island is strongly committed to support the Federal Government's action plan on climate change, by supporting the integration of adaptation strategies into economic sectors while growing R&D related to climate change innovation and start-ups.

Locally, indications are strong that progressive climate change practices will be integrated into traditional and emerging economic sectors—including agriculture and aquaculture, fisheries, and tourism—to ensure sustainable practices.

Together, federal and provincial governments' stated priorities indicate a trajectory for growth in demand for individuals with expertise in climate change who are capable of spearheading change and working collaboratively towards solutions.

The ability to respond to such demand for expertise can only be fostered through higher learning and strong collaborative partnerships.





## UPEI's climate programs and partnerships will work to:

- build capacity to support evidencebased decision making that will benefit
   Canada in terms of government policies and actions in long-term climate mitigation and adaptation, and economic investment in infrastructure; support for the sustainability of agriculture, fisheries, aquaculture and other key economic sectors in relation to climate change mitigation and adaptation; advancement of knowledge of municipalities and industry associations in climate change
- improve assessment of climate risk and impact in relation to critical infrastructure, key sectors and industries and impacts such as coastal erosion, that are critical to the regional economy
- improve observation, monitoring, and surveillance networks that directly impact climate-related health, wildlife and ecosystem health, food production and supply (climate science, climate observations, scenarios of future climate, mapping and visualization of climate change, climate mitigation and adaption, economics of climate change, etc.)
- contribute to developing the "clean growth economy" through higher learning and research, as well as advancing economic knowledge of climate change impacts
- provide vital support for private businesses, entrepreneurs, and startups that is needed to transform knowledge and research into action to support clean technology development



## 4.0 RESOURCES TO FULFILL OUR POTENTIAL

UPEI has an outstanding number of existing faculty and leaders who can directly contribute to the success of the new Canadian Centre for Climate Change and Adaptation—including expertise in the areas of climate change, science, environmental studies, policy development, business, technology, and engineering. In addition, UPEI will make strategic faculty hires of experienced leaders who truly appreciate and understand the power of collaborative and mutually beneficial partnerships with industry, bring expertise to the focus areas and are eager to build interdisciplinary teams, and who will exemplify the core values and strategic goals of the new Centre.

#### RESEARCH EXPERTISE

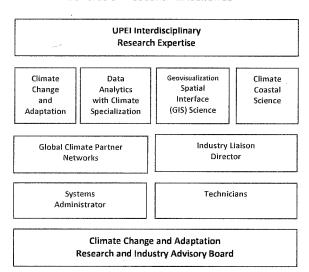
The Research Centres of Excellence will include a core team of research experts from UPEI as well as the University's global partner network.

## Associate Professor, Climate Change and Adaptation

Dr. Adam Fenech has worked extensively in the area of climate change since 1988 starting at the Toronto Conference on the Changing Atmosphere and the IPCC First Assessment Report. Dr. Fenech shared in the 2007 Nobel Peace Prize for his work with the Intergovernmental Panel on Climate Change.

He has edited 7 books on climate change over the past 7 years, most recently as editor of the international journal on Climate Impacts and Adaptation Science. Dr. Fenech has taught at the University of Toronto since 1998, and lectures regularly at universities across Canada and around the world. He joined UPEI as Director of the Climate Research Unit.

#### Collaborative Research Network Centres of Research Excellence



PhD in Data Analytics or Statistics: This researcher will have a research and teaching record of demonstrated excellence in areas related to *Big Data Analytics*. Preference will be given to an individual who has a specialization in an area related to climate science (such as climate change, ocean science, environmental science, disaster risk assessment, or public health) and an interest in interdisciplinary collaboration.

PhD in Geovisualization and Spatial Interface Science (GIS): This researcher will have demonstrated teaching ability, research experience in innovative technology applications for solutions to real world environmental problems, and collaborative relationship building skills. The position will lead innovation in the areas of new interface technology design, empirical human interface use evaluation, and new theory development about engagement of humans and information through the use of these technologies. Research will focus on geospatial tangible augmented reality, mobile geospatial augmented reality, and serious games as applied to real environmental, especially climate change and challenges.

PhD in Climate Coastal Science: This researcher will have a PhD in Costal Engineering or equivalent and demonstrated teaching ability, research experience in innovative technology applications for solutions to real world environmental problems, and collaborative relationship building skills. The position will lead innovation in the area of helping landowners promote the protection of properties from coastal flooding; inland flooding; wave damage; erosive shores; sea-level rise; and dynamic beaches. Research will focus on the feasibility and development of alternatives to adapt to coastal erosion; evaluating, designing, and helping construct projects to protect infrastructure and people; assessing regulatory and environmental efforts for coastal infrastructure protection; and promoting protection of coastal properties.

Four **Technician** positions will be established to work with the research teams. These individuals will have research experience with backgrounds in areas related to environmental science and climate change.

A **Systems Administrator** will be hired to support the day-to-day activities of the School. **Sessional lecturers** will also be engaged to develop and deliver the undergraduate and graduate programs.

**Diverse and complementary expertise at UPEI** from across various disciplines will work closely with the teams of the Centre and Research Centres of Excellence to advance industry collaboration projects and research projects.

UPEI will leverage its growing Global Climate Partner Networks to secure specific areas of expertise to support research projects and initiatives. The Research Centres of Excellence will also work with Adjunct Professors including a Parks Canada Scientist with climate and culture impact expertise, a Senior Conservation Biologist and other researchers with relevant expertise from The Smithsonian Institution.

UPEI will form an **Advisory Board** modeled after similar successful research and industry-focused Advisory Boards currently in place for programs such as the UPEI School of Sustainable Design Engineering and the UPEI School of Mathematical and Computational Sciences.

Securing support from federal and provincial governments to establish the Canadian Centre for Climate Change and Adaptation and effectively engage leading climate researchers is required to maximize knowledge transfer and applied research to benefit sustainable environments and economies regionally and nationally.

## EXPECTED OUTCOMES: ADVANCEMENT, CAPACITY BUILDING, AND ACCELERATION

The Canadian Centre for Climate Change and Adaptation proposes to mobilize new knowledge and expertise in climate change through the advancement of higher learning, building research expertise and supporting evidence-based decision making, and accelerating innovation in relation to climate change, adaptation, and resilience. This will be done through a highly-collaborative approach involving undergraduate and graduate students, expert faculty, and visiting researchers, working with community, industry and government. These outcomes are anticipated to generate benefits on a local and national scale with the potential for lessons learned to be applied internationally.

	Expected Outcomes
Advancement of Higher Learning	Foster the development of the next generation of climate leaders who will emerge from their studies to excel and contribute to the betterment of our local and global communities  Provide students with unique, experiential 'real world' learning opportunities in climate change
Building Research Capacity in Climate Change and Adaptation	Improve assessment of climate risk and impact in relation to key sectors and industries (such as agriculture, aquaculture, tourism, construction), critical infrastructure, and impacts such as coastal erosion, that are essential to the prosperity and growth of the regional economy Improve observation, monitoring, and surveillance networks that directly impact climate-related health, wildlife and ecosystem health, food production and supply (climate science, climate observations, scenarios of future climate, mapping and visualization of climate change, climate mitigation and adaption, economics of climate change, etc.)
Building Capacity in Evidence- Based Decision Making	Build capacity in the development of government policies and actions in long-term climate mitigation and adaptation, and economic investment in infrastructure  Build capacity to support the sustainability of agriculture, aquaculture, tourism and other key economic sectors in relation to climate change mitigation and adaptation, and realize economic opportunities related to new technology adoption  Build capacity to advance the knowledge of municipalities and industry professionals including engineers, land-use planners, natural resource managers, and others in climate change
Acceleration of Innovation	Contribute to the development of a "clean growth economy" through higher learning and research, as well as advancing economic knowledge of climate change impacts  Provide vital support for private businesses, entrepreneurs, and start-ups that is needed to transform knowledge and research into action to support clean technology development  Support key economic sectors in realizing economic opportunities related to new clean growth technology adoption, scalable technologies

## SUPPORTING CLIMATE CHANGE ADAPTATION IN THE COMMUNITY & A CLEAN GROWTH ECONOMY

This transformative, unique in Canada approach to climate change and adaptation research will greatly benefit local, regional, and national economies, in addition to the long-term sustainability of communities and the well-being of citizens.

#### NATIONAL AND REGIONAL RELEVANCE

There are significant benefits of critical magnitude and relevance directly associated with the proposed Centre and research cluster. These include, but are not limited to:

- growth in the skills, knowledge, and understanding necessary to **build capacity in decision making and policy development** in sectors to Atlantic Canada this cannot be understated
- further advancement of knowledge, adaptation, and mitigation strategies working with First
   Nations and population that are particularly vulnerable to climate change (such as Lennox Island, PEI)
- development of much needed collaborative projects with industry to address challenges and
  opportunities through development and adoption of new scalable and practical clean technology
  products and solutions that will lead to entrepreneurial ideas and advances in climate change
  mitigation, resilience, and adaptation strategies greatly improved 'local' knowledge about
  climate change impact and resilience—which research shows the to be of critical importance
  in climate change adaptation to support a clean growth economy and related economic benefits
  associated with this high growth sector (direct, indirect and induced spin offs and good jobs for
  Canadians)
- capacity building and knowledge acquisition among land use planners, engineers and other
  professional and industry sectors responsible for considerable planning, decision making, jobs
  and prosperity, and overall economic impact
- research development and dissemination of information to support the sustainability of
  agriculture, fisheries, aquaculture, tourism and other traditional and emerging sectors that are
  key to economic prosperity and quality of life

- positive impacts to address national concerns about the growing cost of climate change on Canada's prosperity, public health, and in coastal areas. (The National Round Table on the Environment and the Economy, a government-funded think tank, estimated the cost of climate change for Canada at \$5 billion per year in 2020 increasing to between \$21 billion and \$43 billion per year by 2050. Source: http://www.cbc.ca/news/politics/climate-change-could-cost-billions-a-yearby-2020-1.1097373)
- acting on climate change through adaptation and mitigation strategies is a key way to drive down
  costs and will reduce associated risks including to critical infrastructure, food security, human
  health, and economic growth these areas are priorities nationally and internationally
- the continuation of a strong and vibrant university generates direct, indirect, and induced economic spin off in the provincial economy including with the attract of leading researchers to live and work in Prince Edward Island

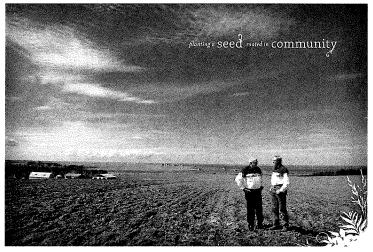
#### COMMUNITY RELEVANCE IN RURAL PEI

Positive impacts on the community of St. Peters and the surrounding area include, but are not limited to:

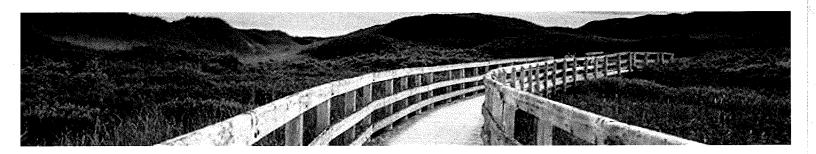
- direct, indirect, and induced economic spin off as a result of more dollars spent in the rural community
- greater diversity in the community as a result of researchers, faculty, visiting researchers, and students of different backgrounds, experiences and cultures from around the world interacting with local residents
- increased visitation in the longer-term from visitors, development of businesses to deliver products and services, and potential experiential tourism offerings through Parks Canada a priority of the Prince Edward Island tourism industry



Climate Change and Aquaculture
A science symposium to communicate current research and science activities to the Atlantic Region's aquaculture industry







## 5.0 PROPOSED PROJECT COSTS & FINANCING

## CREATING A WORLD-CLASS LIVING LAB

The Canadian Centre for Climate Change and Adaptation, including the four Research Centres of Excellence, will be located at a new UPEI satellite campus in St. Peter's, PEI near Greenwich National Park.

An ideal 'living laboratory', Greenwich provides unique learning and research opportunities as it is home to an extensive, fragile coastal dune system, wetlands and various natural habitats in which numerous rare plant species are found. The unusually large and mobile parabolic dunes with their associated counter ridges are rare in North America.

Greenwich is also noted for its cultural and historic assets including traces left by early Aboriginal peoples, the Mi'kmaq, French and Acadian settlers, and Scottish, Irish, and English immigrants.

This unique approach supports the University's priority to build upon the wealth of resources within UPEI and the province by further developing unique relationships, programs, and initiatives that promote PEI as a living laboratory in which complex and relevant questions are explored through a sustainability lens to create new knowledge.

#### **FACILITY OVERVIEW**

The new Canadian Centre for Climate Change and Adaptation facility will include four Research Centres of Excellence, multipurpose space, project-based meeting space, innovation collaboration space, student residence, storage, repair shop, greenhouses, a research garden, and office space.

Common area space within the facility will be designed to encourage faculty, researchers, students, and partners to interact, fuelling innovation and integration of research focus areas.

In keeping with climate action priorities, it is proposed that the new facility be constructed and operated in a sustainable manner. The building's high efficient design features will include renewable energy sources such as wind and solar, geothermal heating and a green roof.

Initial assumptions regarding the gross facility size indicate the need for a building of approximately 36,000 square feet. The estimate was developed through careful consideration of the ideal space for collaboration and research excellence.

ATIA - 20(1)(b)

ATIA - 20(1)(d)

Canadian Centre for Climate Change and Adaptation: Business Plan

### PROPOSED CAPITAL COSTS

UPEI is currently in the process of acquiring land in the St. Peters and Greenwich area of rural PEI and estimates land, land improvements, and site customization costs to be

	Year One to
Land, land improvements, and	
site customization	
Building	
Specialized equipment and	
leading-edge technology	
Computer equipment	
Furniture and fixtures	
Total	

**Table 1: Estimated Total Capital Costs** 

UPEI engaged Nine Yards Studio to prepare a preliminary concept-level design and capital cost estimate for the new facility.

The preliminary construction budget estimate is per square foot, exclusive of specialized technology and equipment. On this basis, the capital costs for the construction of the facility are estimated to be

Although the estimated cost is significant, investing in energy efficiency up front makes the facility more financially sustainable in the long-term, and sends a clear environmental message that is core to the overall purpose of the facility.

	Year One to Three
Research Centres of Excellence	
Residence	
Multipurpose space	
Innovation Collaboration Space	
Storage, repair shop	
and greenhouses	
Total	

**Table 2: Estimated Building Costs** 

## SPECIALIZED EQUIPMENT AND LEADING-EDGETECHNOLOGY

Access to specialized equipment and leading-edge technology is vital to administering educational programming and advancing research in the area of climate change and adaptation.

Through extensive consultation with faculty and industry experts, UPEI has identified the technologies and equipment required for the Canadian Centre for Climate Change and Adaptation and Research Centres of Excellence. Specialized equipment and leading-edge technology are estimated to be (Table 3).

Field monitoring kits and supplies include: climate station array measuring temperature, precipitation, solar radiation, humidity, atmospheric pressure at 100 locations across Prince Edward Island; sea level station array measuring sea level, water temperature and alkalinity at 100 locations around Prince Edward Island; data loggers and telemetry systems for real-time data capture and reporting; climate "data pods" of computer cubicles equipped with geographic information system computers and software for data analysis, visualization and presentation; and large public electronic real- time geographic displays of environmental data.

Communications technology needs include laptops and a dedicated computer server for data storage and big data management. The rural location of facility poses some challenges for connectivity between datagathering devices, researchers, and partners.

ATIA - 20(1)(b)

ATIA - 20(1)(d)

Canadian Centre for Climate Change and Adaptation: Business Plan

Investment in high-quality infrastructure such as computers, networks, servers, and security for movement and management of big data is crucial to the success of the programming andresearch being conducted through the Centre and Research Centres of Excellence.

	Year One to Three
Small, unmanned air vehicles (sUAVs)	
Aerial sensor packages	
Real-time kinetic global positioning systems	
Field monitoring kits and supplies	
Other (research boat, trailer, backup generator)	
State-of-the-art communications infrastructure, computer equipment, networks, servers, and security systems for data storage and management	
Total Leading-Edge Technology and Equipment	

Table 3: Estimated Leading Edge Technology and Equipment Costs

Research Centre specific specialized equipment and leading-edge technologies are identified below.

The Centre for Data and Policy Analysis for Transition to Low-Carbon Economies and the Centre for Climate Change and Human Health includes wind turbines, wave and tidal turbines, solar panel arrays, geothermal and biogas infrastructure for residential, commercial, and community development perspectives; sustainable facilities and smart devices to control energy supply; working labs, and substantial data management

processing systems such as servers, networks, data storage, backup systems, and wireless internet with significant capacity for rapid growth.

The Centre for Coastal Systems Impacts includes research-grade Small, Unmanned Aerial Vehicles (sUAVs) for high precision mapping of coastal regions and an array of sensors; small unmanned above and under water vehicles and an array of sensors; floating global positioning systems for geospatial locating; sensory floating buoys.

The Centre for Clean Technology Innovation in Support of Agriculture and Aquaculture includes:

- a wave/coastal testing water tank ideal for aquaculture and coastal erosion work;
- an offshore floating wind and wave power project renewable energy demonstration for powering floating aquaculture farms (first grid-connected offshore wind turbine in Canada);
- an array of chamber-based greenhouse gas measurements over agricultural fields;
- an array of sensors for environmental measurements over agricultural fields (including soil and ambient temperature, soil moisture and humidity, and solar radiation); and
- electric agricultural vehicles and an electric charging station.

Detailed financial projections are presented in Appendix I, *Projected Statements of Operations*.

Canadian Centre for Climate Change and Adaptation: Business Plan

## START UP AND INDUSTRY COLLABORATION LAUNCH

For the Canadian Centre of Climate Change and Adaptation and Research Centres of Excellence hosted at UPEI to be considered a success, it must attract a substantial number of industry collaboration and industry-based research projects. For this reason, significant efforts will be made from years one to year three to establish and develop strong relationships with both regional and international industry and research partners.

UPEI will require non-repayable start up contributions from government sources in the amount of over the first three over the first three years to launch industry collaboration and partially fund the start up of the four Research Centres of Excellence. After year three, through industry collaboration and Research Centres of Excellence, UPEI expects to secure large-scale industry and research projects that will translate into increased research revenue.

#### PROPOSED CAPITAL FINANCING

For the purpose of budgetary and planning purposes, the proposed financing structure is as follows (Table 4):

Fundraising and donations	Year One to Three
Non-repayable government start up contributions	
Non-repayable government capital contributions	
Total Proposed Project Financing	

**Table 4: Total Proposed Project Financing** 

An investment in the establishment of the Canadian Centre for Climate Change and Adaptation and Research Centres of Excellence is an investment in our collective health, security and prosperity. UPEI can play a significant role working with leading climate experts, government, non-government, community and industry partners to advance research, knowledge, and mobilization of climate change and adaptation — one of the greatest challenges of our time.

UPEI Sustainable Design Engineering Student Orientation at the Greenwich National Park near St. Peter's PEI.

UPEI enjoys a strong partnership with Parks Canada that includes research, service, and community outreach projects relating to sustainable design engineering, climate change, wildlife, and biology at Greenwich.



Canadian Centre for Climate Change and Adaptation: Business Plan



## 6.0 OPERATIONS

## OVERVIEW OF KEY OPERATIONAL ASSUMPTIONS AND FINANCIAL IMPACT OF ALTERNATIVE APPROACHES

### NUMBER OF STUDENTS

UPEI will intentionally maintain a competitive and capped enrollment to enhance the quality of education and the exclusivity of its Bachelor and Master programs. Maintaining smaller cohorts of students will allow for students to have greater access to experienced faculty and resources,

while at the same time creating a highlycollaborative learning environment.





ATIA - 13(1)(c)
ATIA - 20(1)(b)

ATIA - 20(1)(c)
ATIA - 20(1)(d)

Canadian Centre for Climate Change and Adaptation: Business Plan





Canadian Centre for Climate Change and Adaptation: Business Plan



## 7.0 PROJECT GOALS & NEXT STEPS

The following goals and next steps are recommended for the period from September to December 2017:



## **APPENDIX I:**

## PROJECTED STATEMENTS OF OPERATIONS

# Page(s) 154 to 173 are withheld pursuant to paragraph 20(1)(b), 20(1)(c) & 20(1)(d) of the Access to Information Act

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20(1)(b), 20(1)(c) & 20(1)(d)
de la loi surl'accès à l'information

## **APPENDIX II:**

PRELIMINARY CONCEPT-LEVEL DRAWINGS

THE CANADIAN CENTRE for CLIMATE CHANGE AND ADAPTATION
AND RESEARCH CENTRES OF EXCELLENCE
PRELIMINARY CONCEPT DESIGN

THE CANADIAN CENTRE FOR CLIMATE CHANGE AND ADAPTATION AND RESEARCH CENTRES OF EXCELLENCE

PRELIMINARY CONCEPT DESIGN

# Page(s) 176 to 178 are withheld pursuant to paragraph 13(1)(c) of the Access to Information Act

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13(1)(c)
de la loi surl'accès à l'information

## APPENDIX III: THE ROLE OF CONSULTATIONS IN ADVANCING THE SHARED CLIMATE AGENDA

## ADAPTATION AND MOBILIZATION: KEY STAKEHOLDER STRATEGIC ADVICE

In September 2016, UPEI hosted a symposium in which it sought the expertise and input of a diverse group of expert stakeholders to determine how to best build capacity in relation to:

- climate change knowledge and the impact of this knowledge, and
- how to build upon the University's strengths in climate change to create a living lab on Prince Edward Island through which students, researchers, industry, government, and community partners could come together to provide solutions to climate challenges.

#### SYMPOSIUM PARTICIPANTS

SYMPOSIUM HOST

Dr. Alaa Abd-El-Aziz, President and Vice-Chancellor, University of Prince Edward Island

SYMPOSIUM PARTICIPANTS (in alphabetical order)





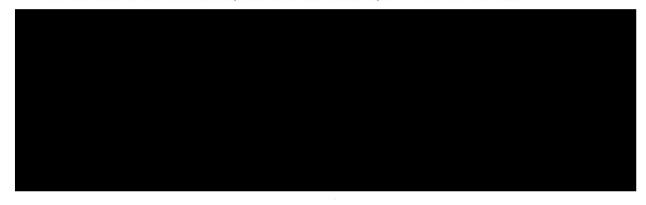
**GUEST SPEAKERS** 



GUESTS WHO WERENOT ABLETO ATTEND THE SYMPOSIUM BUTPROVIDED A LETTER OF SUPPORT

**Dr. Francisco Dallmeier**, Senior Conservation Biologist, Smithsonian Institution

OTHERS WHO WERE CONSULTED/PROVIDED EXPERTISE &/or LETTERS OF SUPPORT



#### **KEY THEMES**

Key themes discussed during the symposium are as follows:

- a strong need exists to facilitate the building of capacity to take action in climate change and adaptation that supports the transfer of knowledge to inform public policy and that fosters innovation working with industry and community;
- UPEI has an opportunity to provide a distinct, unique offering and applied focus that supports climate change action and that mobilizes knowledge into the community, transforming research into action on a local and national scale with lessons learned applied internationally;
- UPEI has demonstrated ability to offer unique problem-solving, hands-on experiences and community work-integrated learning including where students work on projects with community and industry to address specific challenges on a fee-for-service basis;
- there is benefit in engaging citizens in research projects, such as local data collection (building on the current projects of the UPEI Climate Research Lab), to encourage greater community involvement in climate change initiatives and adoption strategies;
- UPEI has existing strengths through its UPEI Climate Research Lab, and other synergistic and interdisciplinary expertise at UPEI, to develop new climate change knowledge and action;
- climate change and adaptation are extremely relevant to local, national, and international economies;
- attracting domestic and international students and visiting researchers through unique programming, technology, research, and expertise will expand the ability to apply climate solutions broadly;
- UPEI has strong national and global climate networks on which to draw expertise for the development and delivery of climate change programming and innovation;
- there is a timely opportunity to build a strong, unique brand (including discussions about use of Greenwich) of benefit to many stakeholders.

As a result of the symposium, several key findings became apparent.

- A need exists for unique and progressive higher learning programs in climate change that can anchor development of new knowledge and, ultimately, the capacity needed for evidencebased decision making required to make a true difference in transitioning to a clean growth economy.
- 2. UPEI has a world-class opportunity to develop an educational, research, and global outreach hub and living lab in partnership with the Parks Canada National Park at Greenwich.
- 3. The collaborative partnership between UPEI and Parks Canada has great potential to further the mandates and shared priorities of both organizations in meaningful ways for Canadians.

- 4. The concept of a hub for climate change and adaptation higher learning and research has the ability to foster innovation, incubation of ideas, and entrepreneurship related to climate change and the clean economy in a manner that could realistically establish UPEI as an agent of climate change action with lessons to share on a global scale.
- 5. Primary industry sectors, such as agriculture and aquaculture, fisheries, and tourism, as well as other sectors, municipalities, and professional organizations will benefit directly from the development of new knowledge and climate solutions.

The consistent message which emerged throughout the symposium was that UPEI should accelerate efforts to greatly accelerate and enhance its existing focus on climate change research and community mobilization for the benefit of our communities and future climate leaders.

UPEI was very pleased with the level of support and commitment for the proposed new direction provided during all stakeholder consultations. A report on the symposium and outcomes, including a detailed list of stakeholders, is provided in Appendix IV.

Further internal and external consultations with stakeholders, including the community of St. Peter's, are scheduled to take place at the appropriate planning stages.

## **APPENDIX IV:**

BUILDING CAPACITY IN
CLIMATE CHANGE ADAPTATION AND RESILIENCE

PHASE ONE REPORT: SYMPOSIUM SUMMARY FEEDBACK

Symposium hosted by:

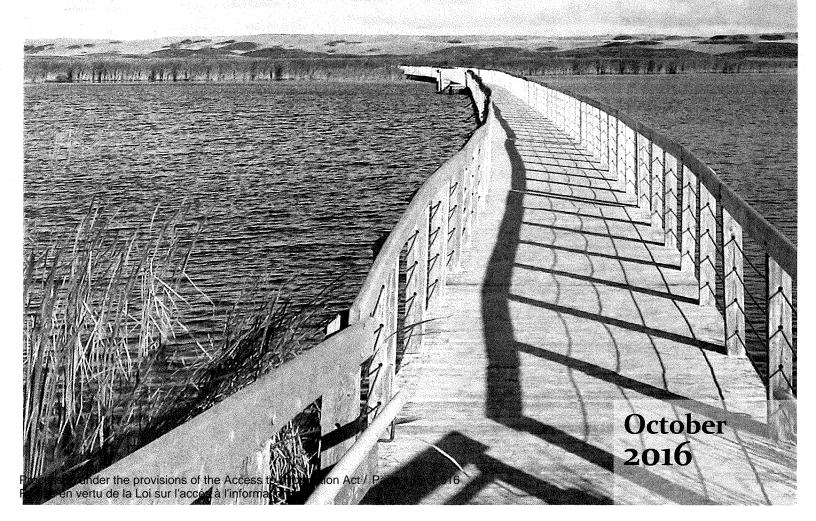


JPEI Climate Research Expertise

## Building Capacity in Climate Change Adaptation and Resilience

## **Phase One Report:**

**Symposium Summary Feedback** 



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## 1. BACKGROUND

The University of Prince Edward Island (UPEI) and Parks Canada enjoy a strong, collaborative partnership built on shared goals that support education, scientific discovery, and community outreach in novel and exciting ways.

Building on this strong partnership, UPEI and Parks Canada originally identified the concept to establish the *Institute for Climate Change Adaptation and Resilience* at Prince Edward Island National Park's Greenwich Interpretation Centre (St. Peters Area, PEI) – a location that provides a natural and cultural setting with significant potential to function as a world class 'living lab' (Appendix A).

In September 2016, the University of Prince Edward Island hosted a symposium involving leading research, industry, government, and community representatives with national and international connections. The overall objective of the Symposium was to discuss, explore, validate, and further define the proposed concept for the Institute for Climate Change Adaptation and Resilience.

Appendix B includes a list of Symposium participants as well as guest speakers who shared sector insights and lessons learned for consideration during the discussions about the proposed Institute. Appendix C provides an overview of secondary review and analysis of other institutions which was conducted in preparation for this symposium.

The Symposium began with an overview of the proposed concept and additional background on the strategic priorities of the University of Prince Edward Island including internationally recognized expertise in climate change, and Parks Canada.

The key findings from the Symposium are summarized in this document and help to inform the next steps of the planning process. After reflecting on the participant feedback, UPEI has further conceptualized the direction for *Building Capacity in Climate Change Adaptation and Resilience*. A high-level overview of this evolved concept is presented in Section 3 of this report. The combined findings presented in this document will help to inform the development of a detailed business plan, as outlined as part of the next steps found in Section 4 of this report.

# 2. KEY SYMPOSIUM RECOMMENDATIONS

The key recommendations identified by Symposium participants are presented below.

# **World-Class Research Hub and Strong Collaborations**

Participants described the Institute as a hub that connects community and industry with researchers, becoming known for world-class research, collaboration and developing solutions. The Institute would create an environment that facilitates the building of capacity in climate change, as a think tank (both physically and virtually), and that fosters innovation, the incubation of new ideas, and entrepreneurship related to climate change.

Collaborative efforts in Greenwich would involve researchers, academia, government, community, Aboriginal, industry, and other visitors from around the world. This activity will support a vibrant community in St. Peters Area and generate incremental economic activity that benefits local and provincial economies.

# **Climate Change Solutions and Action Focus**

A consistent theme is for the Institute to focus on action, becoming an agent or instrument of change. This action was described as a distinguishing factor of the Institute, specifically, building capacity in PEI to take action and use evidence-based decisions to enable lessons learned on a global scale. In addition to transforming research into action locally and internationally, participants spoke about advancing research and informing public policy. This feedback is consistent with the proposed concept of the Institute becoming a 'living lab' in Greenwich (St. Peters Area) (Appendix A).

FutureEarth Research for Global Sustainability "Knowledge-Action Networks, a collaborative framework that facilitates highly integrative sustainability research." Dr. Gordon McBean

Future Earth is a major international research platform providing the knowledge and support to accelerate transformations to a sustainable world. Launched in 2015, Future Earth is a 10-year initiative to advance Global Sustainability Science, build capacity in this rapidly expanding area of research and provide an international research agenda to guide natural and social scientists working around the world. (http://futureearth.org)

The Woods Hole Oceanographic Institution is "committed to understanding all facets of the ocean as well as its complex connections with Earth's atmosphere, land, ice, seafloor, and life—including humanity. This is essential not only to advance knowledge about our planet, but also to ensure society's long-term welfare and to help guide human stewardship of the environment. WHOI researchers are also dedicated to training future generations of ocean science leaders, to providing unbiased information that informs public policy and decision-making, and to expanding public awareness about the importance of the global ocean and its resources." (www.whoi.edu/main/vision-mission)

Participants spoke about mobilizing new knowledge within the community. This includes a strong focus on outreach and engagement. Specific suggestions included the following:

- Engage youth and younger generations to help transform society and create future leaders in climate change
- Be a centre where community/industry can come to work with students and researchers on specific projects to address issues related to climate change
- Use social media to engage citizens and communities in the identification and decision making processes
- Host events where industry and researchers come together to discuss challenges and potential solutions
- Provide students with truly unique problem-solving, hands-on experiences and community work-integrated learning to help address specific challenges on a fee for service basis
- Define objectives and specific measurable outcomes for students and provide virtual as well as hands-on learning experiences
- Engage citizens in research projects, such as local data collection (building on the current projects of the UPEI Climate Research Lab), to encourage greater community involvement in climate change initiatives

# Clear Purpose and Strong Brand

Symposium participants spoke about the need to have a clear focus and unique/differentiated position that leverages the strengths of the University of Prince Edward Island, the UPEI Climate Research Lab, and other synergistic and interdisciplinary expertise. This expertise may include the following:



The following four sectors, which were identified during pre-Symposium consultations, were presented to participants as the potential areas of focus for the proposed Institute.



During the Symposium discussions, a clear theme emerged that all identified sectors are important and are interconnected as part of a community focus. These sectors are relevant to local, national and international economies. The discussions led to the recommendation that a focus on coastal community would support the long-term sustainability of the Institute.

#### Leading Institutions have leveraged natural and cultural resources to define a true uniqueness.

IISD (International Institute for Sustainable Development) Experimental Lakes Area is one of the world's most influential freshwater research facilities located at one of the longest <u>continuous freshwater</u> <u>datasets</u> in the world. (Manitoba Canada)

The need to establish a strong brand was a common theme identified during the Symposium, and positive comments were shared about the Parks Canada (and Greenwich) brand and the potential for creating a simple name for the Institute, similar to The Banff Centre.

Leading Institutions have developed a strong brand appeal that is attractive to researchers, community and tourists/visitors.

Smithsonian is the world's largest museum, education, and research complex, consisting of 19 museums and galleries, the National Zoological Park, and nine research facilities.

IISD Experimental Lakes Area is one of the world's most influential freshwater research facilities. Founded in 1968, the Experimental Lakes Area has one of the longest continuous freshwater datasets in the world. The Institute focuses on community outreach, Aboriginal engagement, tours, field courses, and graduate research.

Given these comments, the concept has evolved to include the following:

# **GREENWICH CLIMATE INSTITUTE**

Taking Action on Climate Change
Responding to Challenges of Coastal Communities

NEW KNOWLEDGE (RESEARCH & DATA)

INNOVATION (INCUBATION)

CONNECTIVITY
(OUTREACH & ENGAGEMENT)

Research, Community, Industry, Aboriginal and Government Partners

The Institute's (proposed) Mission is to a leader by building capacity for evidence-based decisions that inform policy, advance research, and enable lessons learned on local and global scales

# **Local and International Scope**

There was agreement on the concept to build capacity in climate change locally to support evidence-informed policy development, research advancement, and application on an international scale. The comment was made to ensure that the Institute addresses local, national and international priorities, which in turn, may also help to attract different funding sources (e.g., government, funds, grants and private sector sponsorships).

Leveraging the existing international network of the UPEI Climate Research Lab and growing the involvement of, and collaboration among, internationally recognized researchers and leading experts was identified as a key to success for the proposed Institute.

The Institute will engage leading research expertise to work on collaborative projects and create new knowledge, approaches, products and solutions. Establishing unique technology, equipment, and expertise that is specific to the Greenwich location was identified as a means to increase the level of international engagement and recognition.

Attracting students from different cultures and backgrounds to support a global higher learning centre was identified as a priority for the Institute. Earning national and international recognition (through world-class research, hosting of national/global conferences, and other activity such as student competitions) was seen as important. Establishing this level of recognition requires building momentum through an early win that is attractive to expert researchers. Broadening the reach through a virtual presence and social media, including to engage youth, was also identified.

# **Collaborative Community**

Participants identified the Institute as a welcoming environment with lots of open space for networking and collaborative working areas. The architectural design of the building would be part of the brand. An investment is needed in infrastructure, equipment and technology that is unique to the Institute and that will be attractive to researchers, industry and community.

The comment was also made to include displays showcasing the impact of climate change on farming, fisheries, and community culture and heritage. Establishing a virtual community was also identified as a potential direction for the Institute.

# **Truly Unique Experiences**

Symposium participants spoke about the need to clearly communicate and demonstrate the value of the Institute to its diverse audiences – researchers and leading experts, community, industry, and tourists.

Comments were made about providing experiences to community, students, tourists, and visitors to help influence their future behaviours. They spoke about providing authentic, life-enriching visitor experiences, and leveraging the experience and skills of the leading tourism operators in Prince Edward Island and Atlantic Canada (including Experience PEI). Participants commented on the strong linkage that exists between the proposed Institute and provincial (and national) priorities to grow coastal tourism experiences and Aboriginal tourism and sustainable



development. Other tourism offerings identified include summer camps (similar to those offered by the Atlantic Veterinary College), a science discovery centre, or a museum.

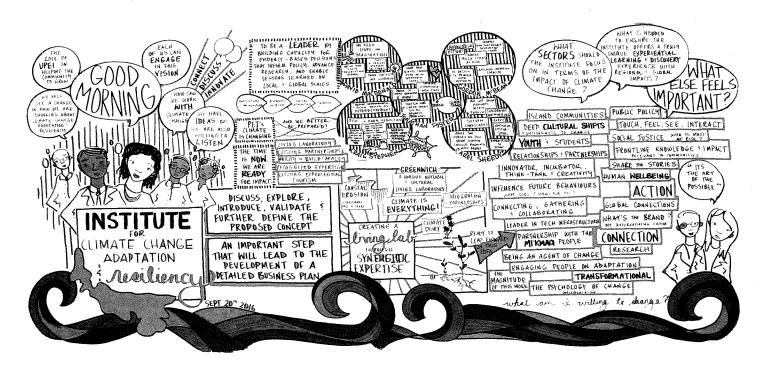
# Leading Institutions have been formed based on a strong partnership between university/research/education and national parks.

Schoodic Education and Research Centre of Acadia National Park (SERC) supports scientific research of importance to the Park, provides professional development for teachers, and educates students to become a new generation of environmental stewards.

Gros Morne Institute for Sustainable Tourism (GMIST) advances the quality and success of Atlantic Canadian tourism operators through an array of training programs to be developed and offered at the Institute. The objective is to enhance the quality and sustainability of outdoor/nature-based experiences afforded throughout Atlantic Canada, by providing developmental training programs respecting: sustainable tourism practices, experiential tourism services and eco-adventure tourism. The Institute is located in beautiful Gros Morne National Park – Rocky Harbour, Newfoundland and Labrador.

#### Conclusion

The University of Prince Edward Island was very pleased with the response rate to participate in the Symposium as well as with the level of engagement and enthusiasm of participants during the Symposium. The discussions and concluding key recommendations provided during the Symposium reinforced the strong potential for UPEI to create a unique approach to climate change in Greenwich, Prince Edward Island. The following page provides a visual overview of the discussions throughout the one-day symposium.



# 3. UPEI RESPONSE

After careful consideration and reflection on the Symposium discussion, the University of Prince Edward Island saw an opportunity to build a true knowledge cluster and living lab in Greenwich. This would involve, in addition to the focus on the research institute and attraction of visitors, a stronger emphasis on students who will help to create this centre of excellence in St. Peters Area, Prince Edward Island.

UPEI envisions the establishment of The UPEI Greenwich School of Climate, a hands-on experiential learning program for students to engage with industry and community, as the anchor of this knowledge cluster. The proposed School will be located within the existing facilities operated by Prince Edward Island National Park at Greenwich.

While the concept of the UPEI Greenwich School of Climate will be further defined, the preliminary details suggest that the School will:

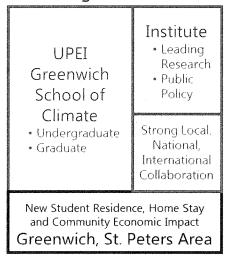
- Offer globally relevant higher learning, with both a Bachelor of Science (BSc) and a Bachelor of Arts (BA) degree that offers a major in Climate Change
- Provide highly interdisciplinary degrees designed to educate students on the complexity of climate change with emphasis on developing tomorrow's leaders in climate change science and policy
- Include two years of core studies at UPEI in Charlottetown, followed by two years of senior courses and work-integrated-learning at the UPEI Greenwich Campus (involving Parks Canada, Environment and Climate Change Canada, and other government departments and agencies with student placements)
- Be selective in student enrollment, including high standards and strong international recruitment
- Be led by a globally recognized climate change scientist in partnership with an individual with parliamentary and legislative expertise, and a team of outstanding faculty members with internationally recognized expertise in frontline research areas such as GIS (geographic information system)
- Deliver programs in collaboration with The Smithsonian Institute (building on an existing memorandum of agreement with the Institute, which includes the world's largest museum, education and research complex, consisting of 19 museums and galleries, the National Zoological Park and nine research facilities) and other global partners
- Be a unique 'living lab' of climate change intended to promote a high level of collaboration by providing community, industry and visitors with access to knowledge and by establishing platforms for sharing information, enabling innovation, and connecting researchers (students, faculty and leading experts) with industry and community to address real-world issues

- Also result in the development of a graduate program in climate change to enable new knowledge acquisitions and the training of tomorrow's science leaders
- Engage researchers and scientists from Parks Canada, Environment and Climate Change Canada, and other organizations to participate as sessional lectures, guest speakers, and occasional project researchers at the UPEI Greenwich Campus

The new School will use the existing infrastructure in Greenwich, which will require renovations and upgrades to convert the existing facility into labs and classrooms and a capital investment in terms of wireless infrastructure, lab equipment and materials, and other. The establishment of a new student residence is proposed while a home stay option will also be provided to students who wish to reside with local families for a further integrative community learning/living experience.

The UPEI Greenwich School of Climate will work closely with the proposed Institute, which has a mission to be a leader in building capacity for evidence-based decisions that inform policy, advance research, and enable lessons learned on local and global scales.

# UPEI Greenwich Campus Knowledge Cluster Centre



The UPEI Greenwich Campus will have a positive socio-economic impact on St. Peters Area. This will include, but not be limited to, the following:

- Rural revitalization with the injection of students and researchers as a place to learn, live, and work
- Greater diversity within the community, with students, visitors, and researchers from around the world connecting with local residents
- Enhanced experiential tourism development with an increase in visitation to the region, supporting tourism priorities for Prince Edward Island; the unique tourism offering will generate national and international exposure through the Parks Canada affiliation
- Direct and indirect economic spin offs with students, faculty and visiting researchers living and spending more dollars in the community and, as a result, increased tourism
- Increased visitation with the electric bus proposed to be designed by the students and faculty of UPEI School of Sustainable Design Engineering

Through the UPEI Greenwich School of Climate, faculty, students and researchers will work more closely with industry to explore challenges and identify solutions. There will be a greater opportunity for knowledge generation and spin offs to include new clean technologies and

other entrepreneurial ideas. The UPEI Greenwich School of Climate will work closely with the students and faculty of the UPEI School of Sustainable Design Engineering and the UPEI School of Mathematics and Computational Sciences on industry engagements and community projects.

# 4. NEXT STEPS

The next steps are as follows:

- Further define the above identified concept
- Conduct two best practices site visits to leading institutions in North America
- Identify equipment and infrastructure needs and associated capital costs
- Develop a detailed business plan including operational budget

## APPENDIX A: ORIGINAL PROPOSED CONCEPT

The following concept was presented to the participants of the Symposium.

# Institute for Climate Change Adaptation and Resilience A Unique Opportunity for Canada

Building capacity in climate change adaptation and resilience in Prince Edward Island so that we can apply this new knowledge locally, regionally, nationally, and internationally

With a focus on the following proposed sectors:



#### **Important Considerations**

- Exemplary **experiential learning and discovery** for students, faculty, community and visitors
- Advancing research and new knowledge to inform public policy and support community adaptation and resilience to environmental challenges; sustainable communities; and natural and coastal ecosystems
- **Innovative industry partnerships** in key economic sectors (e.g., agriculture, aquaculture, fisheries, tourism, information and technology, renewable energy)
- In-depth research and knowledge transfer in support of entrepreneurial opportunities (e.g., clean technology start-ups) and transformation to a Clean Growth Economy
- Strengthening of PEI's experiential tourism offering and economic spin offs in the community
- Expansion of **national and international** networks, alliances and reputation
- Truly unique opportunity for Canada

## **The Proposed Ultimate Goal**

To be a leader in climate change adaptation and resilience by building capacity for evidence-based decisions that inform policy, advance research, and enable lessons learned on local and global scales

#### **Strategic Priorities (Proposed)**

- Engage in collaboration and knowledge transfer to inform public policy and support sustainable communities, adaptable sectors, and entrepreneurial developments (an overall transition to a clean growth economy)
- Deliver truly unique experiential learning and discovery opportunities for students, faculty, visiting public, communities and tourists that attract people from around the world
- Provide government and industry with graduates and the next generation researchers who
  have the skill sets and experiences that will help communities be sustainable
  (economically, health and well-being, and culturally)

The proposed Institute builds on the strategic priorities of the University of Prince Edward Island, which are as follows:

- Outstanding experiential learning opportunities that translate theory into practice for students, faculty, community and visitors
- Discovery and research excellence, leveraging national and international networks
- An intimate learning environment, as the gateway to exceptional educational opportunities to support vibrant communities, working with local, regional, national and international partners
- Expanding our presence in the community

The proposed Institute will leverage the synergistic expertise of interdisciplinary areas within the University:



The proposed Institute will leverage the strengths of the University, UPEI's internationally recognized climate research expertise (through the UPEI Climate Research Lab and international networks), the UPEI/Parks Canada strategic partnership, and the one of its kind natural and cultural living laboratory at Greenwich, Prince Edward Island National Park in St. Peters Bay Area.

Parks Canada has a complementary mandate:

- Protect and present Canada's natural and cultural heritage
- Integrate traditional indigenous knowledge
- · Habitats, wildlife and ecosystem protection
- Species at risk protection and recovery
- · Experiential learning and discovery for visitors
- National network
- International reputation

This concept is not new to UPEI and many keys to success are already in place for the proposed Institute. **Ready for Impact**"

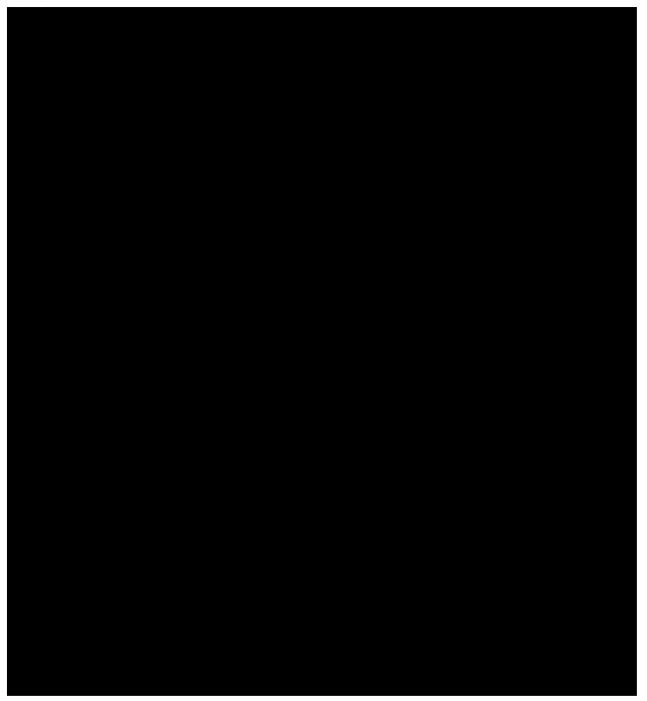
- Demonstrated cluster leadership and internationally recognized expertise in climate change
- **Existing** natural and cultural unique setting of the Greenwich peninsula, a 'living laboratory'
- **Proven ability** to build capacity in climate change adaptation that can be applied to other regions
- Strengthening of an **existing** experiential tourism product offering with international appeal
- Building capacity through an existing UPEI/Parks Canada strategic partnership

# **APPENDIX B: PARTICIPANT LIST**

# **Symposium Host**

Dr. Alaa Abd-El-Aziz, President and Vice-Chancellor, University of Prince Edward Island

Symposium Participants (in alphabetical order)





### **Guest Speakers**



Guests who were not able to attend the Symposium but provided a Letter of Support

Dr. Francisco Dallmeier, Senior Conservation Biologist, Smithsonian Institution (Appendix D)

# **APPENDIX C: ENVIRONMENTAL SCAN**

#### 1.0 Introduction

As part of the initial research for this engagement, MRSB conducted an environmental scan of existing Canadian and International climate change centres and coastal ecosystem research centres. The descriptions below include most of the Centres in Canada but the global examples are not exhaustive. Many of the Centres are affiliated with a university and conduct research in collaboration with researchers at other universities, within government, other research institutes, etc. Some are virtual networks with research conducted at various locations depending on the nature of the research, some have dedicated field stations. One example which might be interesting in terms of Greenwich is the Schoodic Education and Research Centre (SERC) of Acadia National Park in Maine (page 20). It has grown to be a huge facility but the model could still be applicable. It is located in a National Park and works closely with the Park, it was established with government grants and charitable donations and is now managed by a non-profit organization.

#### 2.0 Centres in Canada

#### BRITISH COLUMBIA

#### **Pacific Institute for Climate Solutions (PCIS)**

http://pics.uvic.ca/ - Hosted and led by the University of Victoria in BC in collaboration with BC's three other research intensive universities — Simon Fraser, UBC and UNBC. An external advisory board comprising representatives from the public, private and non-profit sectors contributes advice to the Institute.

PICS is governed by an executive committee appointed by the University of Victoria, a program committee comprising researchers from the four partner universities and representatives from the provincial Climate Action Secretariat (CAS) and the Canadian Centre for Climate Modelling and Analysis of Environment Canada

Canadian Centre for Climate Modelling and Analysis <a href="https://www.ec.gc.ca/ccmac-cccma/-">https://www.ec.gc.ca/ccmac-cccma/-</a> Located at the University of Victoria in BC.

It is a section of the Climate Research division of Environment Canada

The Society of Ecological and Coastal Research (SEACR) <a href="http://whalelab.geog.uvic.ca/seacr">http://whalelab.geog.uvic.ca/seacr</a>- Their research is focused on the west coast of Vancouver Island and includes a specialty in whales. The whale research lab is located at the University of Victoria. Their field station is on an Island 40 minutes away from Tofino by boat. It provides accommodations for the researchers who go out most days for various data

A partnership of the Whale Research Lab and SEACR

collection work.

Hakai Institute https://www.hakai.org/ - It is a scientific research institution with 2 research stations that advances long-term research at remote locations on the coastal margin of British Columbia, Canada. Includes the Coastal Sand Ecosytems group, http://www.hakai.org/ research/coastal-sand-ecosystems a team of interested researchers working on various subprojects that explore the biophysical processes within, connections between, and ecological and/or geomorphic responses of sub-tidal (nearshore), inter-tidal (foreshore), and supra-tidal (backshore) components of coastal sand ecosystems. Activities include short-term research and experimentation, and more long-term monitoring of key environmental attributes in these systems.

The Institute is funded in part by the Tula Foundation, a selffunded family foundation

# Vancouver Aquarium Coastal Ocean Research Institute

https://www.vanaqua.org/act/research/coastal-ocean-research-institute - The Vancouver Aquarium Coastal Ocean Research Institute is new and will systematically collect, analyze, and publicly communicate data describing the health of coastal ecosystems on Canada's West Coast. The Institute will operate within the Aquarium's overall non-profit organizational structure, but will function independently through oversight by a separate Management Board. Three current Vancouver Aquarium Research Programs will become part of the Institute.

It is expected the Institute will be funded by a consortium made up of the Aquarium, individual donors, sponsor companies, foundations and others, and that it will operate as an impartial entity entirely independent of its funders

#### **ALBERTA**

## FRI Research (formerly Foothills Research

institute) http://www.pc.gc.ca/eng/pnnp/ab/jasper/partenaires-partners.aspx#fri - A nonprofit entity which conducts applied research on the cultural, ecological, economic and social values of Alberta's forested landscape. FRI's core study area, located in west-central Alberta and covering about 2.75 million hectares, includes Jasper National Park. Over the years, FRI and Jasper National Park have worked collaboratively on a number of projects. In addition, Park staff sit on several FRI management and steering committees to provide input and project oversight. The shareholders provide stable core funding and in-kind contributions to support overall operations. Other partners provide funding and/or inkind contributions to directly support FRI programs or projects.

FRI's shareholders include various Alberta Government Departments, ConocoPhillips Canada, Parks Canada, Suncor Energy, Talisman Energy, West Fraser Mills, Canfor Corporation and Weyerhauser Co.

## **Municipal Climate Change Action Centre (MCCAC)**

http://mccac.ca/ - Provides funding, technical assistance, and education to support Alberta municipalities in addressing climate change.

A partnership of the Government of Alberta, Alberta Association of Municipal Districts and Counties, and Alberta Urban Municipalities Association

#### **ONTARIO**

#### **McMaster Centre for Climate Change**

http://climate.mcmaster.ca/ - Located at McMaster University within the School of Geography and Earth Sciences and Promotes a multi-disciplinary approach and includes faculty, visiting scientists, research scientists, graduate students, interns, volunteers and staff. In addition to research it is involved in community seminars and outreach. Ecosystem Impacts & Adaptations are one of its research areas.

Sponsored by the RBC Foundation and McMaster University

University of Waterloo - The University has an Interdisciplinary Centre on Climate Change <a href="https://uwaterloo.ca/climate-centre/">https://uwaterloo.ca/climate-centre/</a> and in 2015 as a result of a donation from the Intact Financial Corporation in Nov 2015 has established the Intact Centre on Climate Adaptation (ICCA) <a href="http://www.intactcentreclimateadaptation.ca/">http://www.intactcentreclimateadaptation.ca/</a>

Made possible through a donation from INTACT Insurance

## **Biotron Experimental Climate Change Research**

Centre <a href="http://www.thebiotron.ca/">http://www.thebiotron.ca/</a>- Located at Western University in London, Ontario. The Biotron is a keystone facility supporting research on biotic and abiotic processes in the environment, and specializes in the simulation of natural environments at a range of scales.

A partnership of Agriculture & Agri-Food Canada, the University of Guelph and the University of Western Ontario

#### **QUEBEC**

ArticNet <a href="http://www.arcticnet.ulaval.ca/">http://www.arcticnet.ulaval.ca/</a> - Located at Universite Laval, Quebec, funding is to 2018. It represents Canada's largest commitment to date to explore the social, economic and environmental impacts of climate change and modernization in the coastal Canadian Arctic. Over 135 researchers from 29 Canadian universities collaborate with federal, provincial and territorial agencies and departments, Inuit organizations and industry partners on projects.

A Centre of Excellence for Commercialization and Research through the Networks of Centres of Excellence (NEC) Canada Program

Ouranos <a href="https://ouranos.ca/en/-">https://ouranos.ca/en/-</a> Located in Montreal, it is a private non-profit consortium that develops collaborative projects on regional climate change and adaptation. It is currently partnering with

Partners include Province of Quebec, Hydro Quebec, Environment Canada, INRS (Institute of Scientific Research),

Ouranos on a NCE (see ArticNet) proposal for the 2017 funding competition.

UQAM, McGill and Laval University

# ATLANTIC CANADA

Fisheries and Oceans Canada <a href="http://www.dfo-mpo.gc.ca/science/regions/index-eng.htm#ios-">http://www.dfo-mpo.gc.ca/science/regions/index-eng.htm#ios-</a>
Operates a number of institutes, laboratories and experimental centres across the country, some of which do work related to climate change and coastal ecosystems. There are 2 in the Maritimes – St. Andrew's Biological Station and the Bedford Institute of Oceanography. The Bedford had 5-year funding for an Aquatic Climate Change Adaptation Services Program (ACCASP) from 2011 to 2016. It is not clear from an internet search if funding was renewed.

Operated by the Department of Fisheries and Oceans Canada (DFO)

Not climate change focused but interesting model

#### **Tantramar Wetlands Centre**

http://weted.com/about-us/

A centre of excellence in wetlands education, this indoor and outdoor facility offers students and visitors opportunities to experience the value of wetlands through innovative educational programming. The Centre is adjacent to the campus of Tantramar Regional High School, situated on the edge of the world famous Tantramar Marshes. It includes 15 hectares of fresh-water wetland and a 6,000 sq.ft. indoor facility that provides laboratory space and a fully wired teaching theatre to support the outdoor programs. In 2002, the Jolicure Lakes Field Station inside the Tintamarre National Wildlife Area was added to further extend experiential programming options. A unique feature of the Centre are the student-leaders of Tantramar Regional High School. Known as the Wetheads, this group of young people is very effectively passing on to others what they have learned about the value of wetlands and the need to develop a culture of sustainability.

A partnership of Tantramar Regional High School, Ducks Unlimited Canada, the Canadian Wildlife Service, New Brunswick's Department of Natural Resources, the Town of Sackville and School District 02. Also supported by a number of key public and private sector contributors such as NSERC, MEC, and the Imperial Oil Foundation and key community supporters such as individuals and local businesses

### 3.0 International Centres

United States of America



# Schoodic Education and Research Centre of Acadia National Park (SERC)

https://www.nps.gov/acad/serc.htm - Located in Maine, the center is designed to expand the role of research within the national parks; allow for more informed, science-based management decision-making; and share research results with researchers, local communities, students, educators, and the public. Within Acadia National Park, SERC staff help facilitate research projects throughout the park and, when the results are available, provide opportunities for learners of all ages to discover the park's natural and cultural resources through this research. The SERC campus includes varied facilities, from meeting and classroom space to lodging and recreational facilities. It is located on the Atlantic coast and offers easy access to coastline habitat, intertidal zones, and spruce/fir forests. The campus was funded by multi-million dollar investments from the USA government and philanthropists. It is managed by the Schoodic Institute, a non-profit organization, Schoodic Institute and Acadia National Park are national leaders in the development of new techniques to involve the public in science and conservation. Schoodic Institute deliberately and tightly intertwines education with research. The Institute's non-profit structure allows more flexibility in creating innovative partnerships. It supports scientific research of importance to the Park, provides professional development for teachers, and educates students to become a new generation of environmental stewards.

One of 20 National Park Service research learning centres in the USA. It is managed by the Schoodic Institute, a nonprofit organization

#### **Centre for Climate and Energy Solutions (C2ES)**

http://www.c2es.org/about/contact - Located in Arlington, Virginia, it is the successor to the Pew Centre on Global Climate Change. It focuses on advancing strong policy and action to address climate and energy challenges

An independent non-partisan non-profit organization

National Oceanic and Atmospheric Administration (NOAA) National Ocean Service (NOS) - Supports five National Centres for Coastal Ocean Science (NCCOS)

Part of the USA Department of Commerce

https://coastalscience.noaa.gov/about/centers/col which work with the NOC Coastal Ocean Science Board to identify coastal management needs and to prioritize efforts. Three of the centers are dedicated research laboratories, another conducts research through analyses of field data, and one funds research with competitive grants. As an example, the Cooperative Oxford Laboratory (COL) is located on Chesapeake Bay, in Oxford, Maryland and administered by NOAA's National Ocean Service. The laboratory is a collaborative research facility with on-site partners, including: NCCOS, NOAA's Chesapeake Bay Office, the Maryland Department of Natural Resources, and the U.S. Coast Guard. This structure benefits NCCOS, and the COL by providing a greater diversity of scientific expertise required to address complex coastal ecosystem issues.

#### The Long Term Ecological Research Network

https://www.lternet.edu/ - There are over 25 sites around the USA. For example, the Georgia site on the central Georgia coast encompasses three adjacent sounds (Altamaha, Doboy, Sapelo) and includes upland (mainland, barrier islands, marsh hammocks), intertidal (fresh, brackish and salt marsh) and submerged (river, estuary, continental shelf) habitats.

Created by the National Science Foundation in the USA (an independent USA government agency responsible for promoting science and engineering research)

# US Geological Survey (USGS) Western Ecological Research Centre (WERC)

http://www.werc.usgs.gov/Project.aspx?ProjectID=222 -, USGS WERC leads a multidisciplinary Coastal Ecosystem Response to Climate Change (CERCC) program. The focus of CERCC is to engage natural resource managers at coastal sites and provide them with "bottom-up" climate change understanding and adaptation at local and regional scales.

A partnership of the University of California, Oregon State University and the USGS (the sole science agency for the Department of the Interior)

#### **SWEDEN**

Stockholm Environment Institute (SEI) <a href="https://www.sei-international.org/">https://www.sei-international.org/</a> It is headquartered in Stockholm, Sweden where it is-co-leader of NORD-STAR (Nordic Centre of Excellence for Strategic Adaptation Research), a 5-year

An international non-profit research

initiative that is a collaboration between organizations (primarily universities and institutes) from all 5 Nordic countries. The other locations include York and Oxford in the UK, Estonia, the USA, Asia and Africa.

organization with seven centres worldwide

#### **CARIBBEAN**

#### **Caribbean Community Climate Change Centre**

http://www.caribbeanclimate.bz - Located in Belize. It is the key node for information on climate change issues and the region's response to managing and adaptation to climate change in the Caribbean.

It is an executing agency for donor-funded climate change projects. (a UN CARICOM Specialized Agency)

#### UK

# **Cambridge Centre for Climate Change Mitigation**

Research (4CMR) <a href="http://www.4cmr.group.cam.ac.uk/-">http://www.4cmr.group.cam.ac.uk/-</a>
Located at the University of Cambridge and works closely with the Cambridge Centre for Environment, Energy and Natural Resource Governance. Identifies and assesses policies that reduce the risks of climate change while allowing for global economic development through mitigation and adaptation.

A Department of Land Economy research centre

#### **SPAIN**

#### Basque Centre for Climate Change (bc3)

http://www.bc3research.org/ - Its mission is to prepare a highly-qualified team of researchers with the primary objective of achieving excellence in research, training and dissemination relating to the causes and consequences of climate change.

A Basque Excellence Research Centre

#### **NETHERLANDS**

#### **Red Cross/Red Crescent Climate Centre**

http://www.climatecentre.org/ - It is a Public Benefit Organization under Netherland's law. The Centre's mission is to help the Red Cross and Red Crescent Movement and its partners reduce the impacts of climate change and extreme-weather events on vulnerable people.

A specialist reference centre of the International Federation of Red Cross and Red Crescent Societies (IFRC)

# **APPENDIX D: LETTER OF SUPPORT**

Dr. Francisco Dallmeier, Senior Conservation Biologist, Smithsonian Institution



# Smithsonian Conservation Biology Institute

September 12, 2016

Adam Fenech, Ph.D.
Associate Professor, Environmental Studies
Director, Climate Research Lab
University of Prince Edward Island
550 University Avenue, Charlottetown, Prince Edward Island, Canada C1A 4P3

Dear Colleagues,

Thank you for sharing the proposal to establish an international research institute on climate change adaptation and resilience at the Greenwich facility on Prince Edward Island.

This type of institute is exactly what is needed to focus on the ongoing challenges that a changing climate presents. By centering the institute's work on the vulnerability, impacts and adaptation of climate change to wildlife and biodiversity, the institute will become one of the important pieces of international research needed to address these important issues.

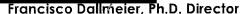
I understand that Greenwich is a unique ecosystem of grasslands, forests, wetlands, beaches and coasts all in a tight geographical area that will allow the area to become a "living laboratory" for climate change research on wildlife and biodiversity.

My work at the Smithsonian Institution over the past 30 years has concentrated on research, monitoring and training in the area of biodiversity. I have brought Dr. Fenech into my work since 1995 to assist in capturing the atmospheric and climate aspects to my research. Most recently, as an adjunct professor at George Mason University, Dr. Fenech has taught climate change courses at the Smithsonian Mason School of Conservation at the teaching facility at Front Royal, Virginia, USA.

I look forward to the establishment of this institute, and see continuing my relationship more formally through this institute whereby my work with the Smithsonian Institution will continue and expand into the east coast of Canada.

I look forward to visiting soon.

Sincerely,



Center for Conservation and Sustainability Smithsonian Conservation Biology Institute 1100 Jefferson Drive, Suite 3123 Box 37012 MRC 705 Washington, DC 20013 -- 7012

**202 633-4782** 

# APPENDIX V: ADMISSION REQUIREMENTS, PROGRAM MATRIX AND COURSE DESCRIPTIONS for UPEI BACHELOR OF SCIENCE IN APPLIED CLIMATE CHANGE AND ADAPTATION

(Note: The following information is as presented within MPHEC submission in April 2017. Some minor details may vary as per the normal course of program development and planning.)

#### ADMISSION REQUIREMENTS AND STANDARDS SPECIFIC TO THE PROGRAM

#### Introduction

The Bachelor of Science in Applied Climate Change and Adaptation is a 127 semester hour degree program.

#### Overview

The UPEI Bachelor of Science in Applied Climate Change and Adaptation provides students with a strong foundation in climate sciences complemented by courses in climate related policy and cultural impacts of climate change. The program offers strong comprehensive theory-based courses and a high level of experiential and applied learning. Courses are designed to develop well-rounded students who have a high level of climate change science knowledge supported by highly relevant skills needed to utilize climate change related technology. Faculty members teaching within the Bachelor of Science in Applied Climate Change and Adaptation program are focused on providing quality instruction and student growth within a cohort-based learning community. Graduates of the program will emerge ready to pursue various climate change related careers, professional studies, or graduate education.

#### **Applied Climate Change and Adaptation**

This program of study examines "climate change adaptation" which refers to the adjustments that societies or ecosystems make to limit the negative effects of climate change or to take advantage of opportunities provided by a changing climate. Adaptation can range from a farmer planting more drought-resistant crops to a coastal community evaluating how best to protect its infrastructure from rising sea level. Climate change is already impacting societies and ecosystems around the world, and many impacts are expected to increase as global temperatures continue to rise. While reducing greenhouse gas emissions is required to avoid the worst impacts of climate change, a certain amount of global warming is inevitable, due to the long-lasting nature of greenhouse gases already in the atmosphere, and to heat already stored in the oceans. Adapting to the changes that are already underway, and preparing for future climate change, can help reduce the risks societies will face from climate change.

#### **Admission**

Students will apply directly from high school to the UPEI Bachelor of Science in Applied Climate Change and Adaptation program. Admission will be capped at 40 students, with two of the 40 seats dedicated for Aboriginal students. Students of the program will progress as a cohort. All eligible first year candidates are ranked on their average in Grade 12: academic English, academic Math, academic Chemistry, academic Biology, one other Grade 12 academic subject; minimum overall average of 70% with no individual grade below 65%.

Applicants whose average in Biology, Chemistry, English and Math is 89% and above when final results for first semester grades are obtained will receive an "Early Offer" of admittance. This "Early Offer" process is subject to chance dependent on program capacity. All other applicants will be ranked. The majority of offers will be made by April. Further offers are made in May and July. Applicants deemed as alternates and enrolled in courses are to have all prerequisite courses completed by June 30. Final official transcripts must be received at the Registrar's Office no later than July 15.

In an effort to support a diverse cohort and build a program with global perspectives and global knowledge transfer opportunities, UPEI proposes to admit an equal number of domestic and international students. Consideration will be given to students transferring into the program based on eligibility and enrolment numbers. University transfer students are subject to existing requirements for undergraduate admissions for the Faculty of Science.

# COURSE MATRIX UPEI BACHELOR OF SCIENCE IN APPLIED CLIMATE CHANGE AND ADAPTATION

	ERM 1 (YEAR 1 – FALL SEMESTER)	SemHr		TERM 2 (YEAR 1 – WINTER SEMESTER)	SemHr
ACC 1010	Introduction to PEI's Living Climate Lab	3	ACC 1020	Introduction to Community Climate Program	3
				Technologies	
BIO 1010	Current Issues in Environmental Biology	3	ACC 2030	Indigenous Knowledge in Climate Change and	3
				Adaptation	
ENV 1010	Introduction to Environmental Studies	3	CS 1510	Introduction to Computer Science I	3
MATH 1910	Single Variable Calculus I	4	UPEI 1010,	Writing Studies	3
			UPEI 1020,	Engaging Ideas and Cultural Context	
			or UPEI 1030	Engaging University Contexts and Experience	
One of the following electives:		3	One of the f	following electives:	
CHEM 1110	General Chemistry I		ECON 1010	•	
HIST 1010	Canadian History — Pre-Confederation		PHIL 1050	Technology, Values and Science	3
PSYC 1010	Introduction to Psychology I		PHYS 1210	Physics for Life Sciences I	
т	ERM 3 (YEAR 2 – FALL SEMESTER)	SemHr	7	TERM 4 (YEAR 2 – WINTER SEMESTER)	SemHr
CHEM 2XXX	Environmental Chemistry (note: currently	3	ACC 1030	Surveying Cultural Landscapes in the	3
	being modified for non-Chemistry majors)			Environmental Humanities	
PHIL 2030	Environmental Philosophy	3	BIO 3270	Field Coastal Ecology	3
PHYS 2610	Atmospheric and Ocean Physics	3	ENV 3110	Understanding Climate Change	3
STAT 2210	Introductory Statistics I	3	POLS 2020	The Politics of Climate Change and Adaptation	3
One of the following electives:			One of the following electives:		
	_		ENV 3210	Natural Hazards	
ENG 2060	Critical Approaches to Texts 1		ENV 3420	Environment and Development	
ENV 2120	Earth Physical Science		ENV 3510	Sustainable Community Planning	
SOC 2660	Science, Culture and Society	3	STAT 2220	Introduction to Statistics II	3
race (with the control of the control of the control of the		School Section 1			Selection and programme and an ex-
	SUMME	R SEMESTI	ER 1 (YEAR 2)		SemHr
ACC 2160	Work Integrated Learning I	R SEMESTI	ER 1 (YEAR 2)		SemHr 3
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ACC 3010	Work Integrated Learning I  ERM 5 (YEAR 3 – FALL SEMESTER)  Global Climate Change Vulnerability and Adaptation	SemHr 3	ACC 3040	T	3 SemHr 3
ACC 3010	Work Integrated Learning I  ERM 5 (YEAR 3 – FALL SEMESTER)  Global Climate Change Vulnerability and Adaptation  Climate Future and Modelling	SemHr 3	ACC 3040 ACC 3060	Climate Change Statistics in R  Visualization of Climate Change	3 SemHr 3
ACC 3020	Work Integrated Learning I  ERM 5 (YEAR 3 – FALL SEMESTER)  Global Climate Change Vulnerability and Adaptation  Climate Future and Modelling  Climate Change Surveillance	SemHr 3	ACC 3040 ACC 3060	Climate Change Statistics in R  Visualization of Climate Change Geographic Information Systems for Climate	3 SemHr 3
ACC 3010 ACC 3020 ACC 3030	Work Integrated Learning I  ERM 5 (YEAR 3 – FALL SEMESTER)  Global Climate Change Vulnerability and Adaptation  Climate Future and Modelling	SemHr   3   3   3   3	ACC 3040 ACC 3060 ACC 3090	Climate Change Statistics in R  Visualization of Climate Change  Geographic Information Systems for Climate Change	3 SemHr 3 3
ACC 3010  ACC 3020  ACC 3030  ACC 3050	Work Integrated Learning I  ERM 5 (YEAR 3 – FALL SEMESTER)  Global Climate Change Vulnerability and Adaptation  Climate Future and Modelling  Climate Change Surveillance  Renewable Energy and Clean	SemHr   3   3   3   3	ACC 3040 ACC 3060 ACC 3090	Climate Change Statistics in R  Visualization of Climate Change Geographic Information Systems for Climate Change Climate Change Management and Adaptation	3 SemHr 3 3
ACC 3010 ACC 3020 ACC 3030	Work Integrated Learning I  ERM 5 (YEAR 3 – FALL SEMESTER)  Global Climate Change Vulnerability and Adaptation  Climate Future and Modelling  Climate Change Surveillance  Renewable Energy and Clean Technologies  Climate Change Impacts on Biodiversity	SemHr   3   3   3   3   3   3	ACC 3040  ACC 3060  ACC 3090  ACC 3120  ACC 3140	Climate Change Statistics in R  Visualization of Climate Change Geographic Information Systems for Climate Change Climate Change Management and Adaptation in Canada Business Risk Assessment under Climate Change	3 SemHr 3 3 3 3
ACC 3010  ACC 3020 ACC 3030  ACC 3050  ACC 3100	Work Integrated Learning I  ERM 5 (YEAR 3 – FALL SEMESTER)  Global Climate Change Vulnerability and Adaptation  Climate Future and Modelling  Climate Change Surveillance  Renewable Energy and Clean Technologies  Climate Change Impacts on Biodiversity	SemHr   3   3   3   3   3   3	ACC 3040 ACC 3060 ACC 3090 ACC 3120	Climate Change Statistics in R  Visualization of Climate Change Geographic Information Systems for Climate Change Climate Change Management and Adaptation in Canada Business Risk Assessment under Climate Change	3 SemHr 3 3 3 3 SemHr
ACC 3010  ACC 3020  ACC 3030  ACC 3050  ACC 3100  ACC 3160	Work Integrated Learning I  ERM 5 (YEAR 3 – FALL SEMESTER)  Global Climate Change Vulnerability and Adaptation  Climate Future and Modelling  Climate Change Surveillance  Renewable Energy and Clean Technologies  Climate Change Impacts on Biodiversity  SUMMER  Work Integrated Learning II	SemHr 3 3 3 3 3	ACC 3040 ACC 3060 ACC 3090 ACC 3120 ACC 3140 ER 2 (YEAR 3)	Climate Change Statistics in R  Visualization of Climate Change Geographic Information Systems for Climate Change Climate Change Management and Adaptation in Canada Business Risk Assessment under Climate Change	3 SemHr 3 3 3 3 SemHr 3
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#### **COURSE DESCRIPTIONS**

#### **Applied Climate Change and Adaptation Courses**

#### **ACC 1010 INTRODUCTION TO PEI'S LIVING CLIMATE LAB**

Prince Edward Island is often referred to as a "living laboratory" because of its manageable size for research conceptualization, design and execution. This course focuses on how Prince Edward Island is the perfect "living laboratory" for understanding the causes, impacts, and solutions to the challenge of climate change. By visiting unique areas across the Island such as the parabolic sand dunes at the Greenwich site of the PEI National Park; the Acadian forest at MacPhail Woods; the Hillsborough River Heritage Watershed; the coastal dune system at Basin Head featuring unique white sands and a nearby protected marine area; the Wind Energy Institute of Canada at North Cape; the agricultural research at Cavendish Farms; DesRoches Pond at Blooming Point; and the First Nations community of Lennox Island, students will examine how these areas can play a role in understanding the vulnerability, impacts and adaptation to climate change.

PREREQUISITE: None

Three hours a week, field trips

Three semester hours

#### **ACC 1020 INTRODUCTION TO COMMUNITY CLIMATE PROGRAM TECHNOLOGIES**

This course provides an introductory hands-on experience in utilizing innovative technologies to develop solutions to the challenges that communities face under future climate change. Focusing on skills development in drone technology, video game programming, geographic information systems, global positioning systems, mapping, surveillance, and renewable energies, this course examines how innovative technologies can assist in the understanding of the vulnerability, impacts and adaptation to climate change. Students will develop technology skills in personal and social responsibility; planning, critical thinking, reasoning, and creativity; strong communication skills, both for interpersonal and presentation needs; cross-cultural understanding; visualizing and decision making; knowing how and when to use technology; and choosing the most appropriate tool for the task.

PREREQUISITE: None

Three hours a week, field trips

Three semester hours

#### **ACC 1030 Surveying Cultural Landscapes in the Environmental Humanities**

Designed to engage students directly with the island habitat around them, this experiential-based course draws upon a range of humanities-based disciplines as it explores the ways in which human culture has responded to and been shaped by aspects of the natural environment. After an introductory look at the history of the human response to nature, we will focus on modern and contemporary responses from the areas of philosophy and ethics, visual arts, literature, anthropology, architecture, biology, and music. This reading will form the backdrop to our exploration of a range of island settings including Greenwich, MacPhail Woods, Lennox Island, and North Cape, each of which offer specific local instances of how physical and cultural environments shape one another. Grounded in the Environmental Humanities as a prevailing interdisciplinary approach, the course integrates humanities-based understandings of the natural world with direct participation in it.

PREREQUISITE: None

Three hours a week
Three semester hours

#### ACC 2030 INDIGENOUS KNOWLEDGE IN CLIMATE CHANGE AND ADAPTATION

Indigenous knowledge is the local knowledge that is unique to a culture or society. Other names for it include 'local knowledge', 'folk knowledge', 'people's knowledge', 'traditional wisdom' or 'traditional science'. This knowledge is passed from generation to generation, usually by word of mouth and cultural rituals, and has been the basis for agriculture, food preparation, health care, education, conservation and the wide range of other activities that sustain societies in many parts of the world. Archaeologists have found evidence of early Mi'kmaq settlements on Prince Edward Island that date back thousands of years. Indigenous people have a broad knowledge of how to live sustainably. This course brings this knowledge of Canadian Indigenous communities' relationship to the environment as valuable lessons for understanding climate vulnerability, impacts and adaptation. Students will be led by a local First Nations teacher whose valuable insights to implementing efficient uses of our land and spiritual relationships with nature can assist in addressing global sustainability.

PREREQUISITE: None Three hours a week Three semester hours

#### **ACC 2160 WORK INTEGRATED LEARNING (I)**

This course is a summer work-integrated-learning (WIL) opportunity facilitated through either a flagship partnership agreement with Parks Canada, or a number of government and industrial organizations that will provide real-world experiences to students that will assist them in securing employment upon graduation.

Eight weeks work experience
Three semester credits

#### ACS 3010 GLOBAL CLIMATE CHANGE VULNERABILITY AND ADAPTATION

This course examines the impacts of changing climate on natural and human systems and focuses on the capacity of societies to adjust to, plan for, and cope with changing climate and environmental conditions. Students will be given the opportunity to understand the physical basis of the natural greenhouse effect, and the human contribution to it; how astronomical forces influence the Earth's climate and their cycles; physical and chemical properties of the atmosphere that influence climate including the role of the cryosphere, oceans, land processes, etc; greenhouse gases (their global warming potential, chemical makeup, and sources and quantifying the human contributions globally, nationally, provincially); and paleological indicators of climate including ice cores, tree rings, sediment cores, etc.; how these indicators are collected; and what they tell us about past temperature changes.

PREREQUISITE: ENV 2120 and ENV 3110

Three hours a week
Three semester hours

#### **ACC 3020 CLIMATE FUTURES AND MODELLING**

This course will provide the knowledge and tools necessary to acquire regional scenarios of future climate change including a rigorous validation exercise of climate model output against historical observations to

help provide confidence that certain models are able to capture observed climatology, while helping to identify those models which appear less suited to particular locations; as well as a multi-model (ensemble) approach to produce climate change projections that is by far the most currently accepted method of considering climate change projections versus the acceptance of a single, or limited number of available models. The course will examine greenhouse gas emissions scenarios and their driving of climate models (Global Climate Models and Regional Climate Models); the Intergovernmental Panel on Climate Change's Special Report on Emission Scenarios (SRES) and the new approaches to future scenarios known as representative concentration pathways (RCPs); and validating climate models against observations. The class structure will vary between lectures, discussions, hands-on exercises, assignments, and a final project. The course is designed to provide the knowledge and theory behind practical tools for understanding how the future climate may change.

PREREQUISITE: ENV 3110

3 hours a week, alternating classroom and laboratory

Three semester hours

#### **ACC 3030 CLIMATE CHANGE SURVEILLENCE**

This course is designed to provide an informed understanding of how the climate is surveyed and monitored. Students will be given the opportunity to understand how the components of climate are monitored instrumentally including temperature, precipitation in its many forms, wind, solar radiation, atmospheric pressure, humidity, etc.; the history of written climate archives, how observations were collected and digitized, then input several pages into climate dataset; databases, how they are organized, software available to assist, how climate records are organized; plan and execute setting up a climate station that reports to a UPEI climate database; online climate records, where they are available, how they are downloaded, how they are organized, quality control climate records; and an introduction on how to analyze climate trends, and calculate climate indices.

PREREQUISITE: ACC 1020

Three hours lecture, three hours laboratory a week

Three semester hours

#### **ACC 3040 CLIMATE CHANGE STATISTICS IN R**

R is a programming language and software environment for statistical computing and graphics supported by the RFoundation for Statistical Computing. The R language is widely used among climatologists for data analysis and provides a wide variety of statistical (linear and nonlinear modelling, classical statistical tests, time-series analysis, classification, clustering, etc.) and graphical techniques, and is highly extensible. This course is designed to provide an introduction to computer programming in R software and how to use R for effective data analysis. You will learn how to install and configure software necessary for a statistical programming environment and describe generic programming language concepts as they are implemented in a high-level statistical language. The course covers practical issues in statistical computing which includes programming in R, reading data into R, accessing R packages, writing R functions, debugging, profiling R code, and organizing and commenting R code. Topics in statistical climate data analysis will provide working examples.

PREREQUISITE: MATH 1910, CS 1510 and STAT 2210
Three hours a week on-line, three hours laboratory
Three semester hours

#### **ACC 3050 RENEWABLE ENERGY AND CLEAN TECHNOLOGIES**

This course provides an in-depth introduction to sustainability theory and green technology, renewable energy in a sustainable future, and why renewable energy is necessary for the future. The course begins with an examination of the historical context for the physical, environmental, technological, economic and political aspects of traditional energy systems and energy transitions. Students will then be introduced to different types of renewable energy technology such as: wind energy, solar, hydro-electric, geothermal energy, wave energy, tidal energy, ocean thermal, fuel cells, heat pump systems, and high voltage DC energy transport. The implementation of these technologies is also studied to understand how they can work as a replacement for conventional technologies.

This course includes a field trip to the Wind Energy Institute of Canada in North Cape, Prince Edward Island.

PREREQUISITE: ACC 1910 and PHYS 2610

Three hours a week
Three semester hours

#### **ACC 3060 VISUALIZATION OF CLIMATE CHANGE**

An emerging approach to enhancing participation and awareness building at the local level is the use of 3D landscape visualisation to depict past and future community scenarios. Various forms of imagery including GIS-based tools, 3D modeling and photo-manipulation have been explored to investigate landscape change and management. These highlight the potential for visualization to influence an individuals' perceptions of landscapes, floods, and a changing environment, which in turn may influence cognitive and affective (or emotive) understanding and influence individual and collective behaviour to respond appropriately to risks. This course will examine forms of climate change visualization employed in climate change impact assessment, through integrating the analytical (including predictive) capabilities of GIS-based software with the emotionally-rich and intuitive media of photo-realistic software; representing recognizable places and local information in a realistic manner (as opposed to more abstract representation) that increases personal relevance; presenting both past and alternative futures (allowing for choice) to assist with decision making; and using computer visualization techniques that allow for modification and user-feedback in a participatory manner for refinement and analysis.

PREREQUISITE: CS 1510

Three hours lecture, three hours laboratory per week

Three semester hours

#### **ACC 3080 REDUCING GREENHOUSE GAS EMISSIONS**

Much like the glass of a greenhouse, gases in our atmosphere sustain life on Earth by trapping the sun's heat. These gases allow the sun's rays to pass through and warm the Earth, but prevent this warmth from escaping our atmosphere into space. Without naturally occurring, heat-trapping gases—mainly water vapour, carbon dioxide and methane—Earth would be too cold to sustain life as we know it. The danger lies in the rapid increase of carbon dioxide and other greenhouse gases that intensify this natural greenhouse effect. For thousands of years, the global carbon supply was essentially stable as natural processes removed as much carbon as they released. Modern human activity—burning fossil fuels, deforestation, and intensive agriculture—has added huge quantities of carbon dioxide and other greenhouse gases. This course will examine the human sources of greenhouse gas emissions, by nation

and by activity, to determine the best approaches for meeting a "safe" or "below dangerous level" of atmospheric concentrations of these gases. Using the Harvey mathematical model, students will comprehensively and critically assess what it would take to stabilize atmospheric CO2 concentration at no greater than 450ppmv without replacing existing nuclear power capacity as it retires and without resorting to carbon capture and storage (CCS).

PREREQUISITE: ENV 3110 and ACC 3020

Three hours a week
Three semester hours

#### **ACC 3090 GEOGRAPHIC INFORMATION SYSTEMS FOR CLIMATE CHANGE**

Geographic Information Systems (GIS) are used in a wide variety of planning, facilities management, resource management, business, and applied research applications. The common thread in this diverse range of applications is the need to store, manipulate, and analyze spatial data. Since spatial factors are central to almost all issues related to planning and geographic inquiry, it is important to develop a sound grasp of GIS principles and the fundamental skills required to apply it in practice. This course provides an introduction to digital mapping and spatial analysis using GIS. Students learn how to create their own maps, how to use GIS software to analyse geographic problems, and learn techniques that can be applied to understanding climate change. The lectures discuss underlying theory and how it is implemented in GIS software. The lab sessions allow students to gain hands-on experience with GIS software as applied to the climate change challenge.

PREREQUISITE: None

Three hours on-line and three hours laboratory a week

Three semester hours

#### **ACC 3100 CLIMATE CHANGE IMPACTS ON BIODIVERSITY**

The changing climate is a significant driver of biodiversity and is already altering many ecosystems. It is necessary to prevent and mitigate these changes to preserve the biodiversity and ecological integrity of the region. This course will review the baseline data and systematic observation networks to assess biodiversity conservation and policy responses to global climate change; integrate our knowledge of likely future changes on biodiversity from a changing climate; examine predictive models and decision support tools to guide the design and selection of adaptation strategies from local to regional scales; and establish a framework for future collaborative research on climate change and biodiversity. A field component of the course will establish a biodiversity-monitoring plot using methods developed by The Smithsonian Institution's measuring and assessing biodiversity protocols.

PREREQUISITE: BIO 3270

Three hours a week with three hours field/laboratory work

Three semester hours

#### ACC 3120 CLIMATE CHANGE AND ADAPTATION MANAGEMENT IN CANADA

This course introduces approaches to environmental management in Canada focused on climate change aspects. Specifically, the course will examine various environmental laws and regulations such as the Canadian Environmental Protection Acts, and other related environmental legislation which helps individuals and companies protect from possible litigation while at the same time helps preserve the environment; will examine how to apply federal and provincial Environmental Assessment legislation to proposed projects such as the Planning Act, by highlighting strategies and nuances of the legislation; and will examine the principles and fundamentals of completing a variety of environmental audits for industry, institutions, and commercial enterprises. An understanding of the Federal Adaptation Policy Framework which guides domestic action by the Government of Canada to address adaptation to the impacts of climate variability and change will be gained through a review of various government agencies.

Assignments will allow students to develop skills in conducting environmental management systems audits and evaluation of the mainstreaming of adaptation into government programming.

PREREQUISITE: POLS 2020 Three hours a week

Three semester hours

#### ACC 3140 BUSINESS RISK ASSESSMENT UNDER CLIMATE CHANGE

Climate change is affecting all businesses and all industries through a changing physical environment and damaging extreme weather events; impending greenhouse gas emission mitigation regulations and legislation; and a need for adaptation measures to address these changing physical and regulatory environments. Business and Climate Change is an interdisciplinary, intensive course designed to provide an informed understanding of business in the era of climate change by examining the implementation of carbon taxes across Canada and comparing with other carbon pricing systems such as the greenhouse gas cap and trade approach. Specialized activities will focus around the business sector of each student's choice focusing on the important role of understanding climate change for business risk assessment.

PREREQUISITE: ENV 3110
Three hours a week
Three semester hours

#### **ACC 3160 WORK INTEGRATED LEARNING (II)**

This course is Year 2 of a summer work-integrated-learning (WIL) opportunity facilitated through either a flagship partnership agreement with Parks Canada, or a number of government and industrial organizations that will provide real world experiences to students that will assist them in securing employment upon graduation.

Eight weeks work experience

Three semester credits

#### ACC 4010 OCEANS, COASTAL SYSTEMS AND CLIMATE CHANGE

This course will focus on understanding the impact of global climate change on the oceans, including warming, ocean acidification, subsurface oxygen depletion, and changes to the marine ecosystem. Implications of these changes for global fisheries and aquaculture will be discussed. Core concepts about how the formation of ocean basins and their influence on climate govern the development of coasts will be introduced. Shoreline classification and coastal sensitivity will be examined through the development of

littoral zones as a key step in being able to assess the effects of coastal risks and hazards (coastal flooding, coastal erosion, and damage to coastal ecosystems) or shorelines. All of these hazards will be examined through the combined actions of sea level rise, tides, storm surge, and wave action. Students will develop a process to assess the vulnerability of the local fishery (eg. lobster fishery) to these climate impacts and develop concrete options for adaptation.

PREREQUISITE: ENV 2120 Three hours a week Three semester hours

#### **ACC 4020 UNCERTAINTY AND PROBABILITY IN CLIMATE CHANGE**

Uncertainty exists in our daily lives as well as in every discipline in science, engineering, and technology. Probability theory is a mathematical framework that allows us to describe and analyze random phenomena (events or experiments whose outcomes we cannot predict with certainty) in the world around us. This course is designed to introduce concepts of probability and uncertainty used in the climate change discipline. The course will provide basic concepts such as random experiments, probability axioms, conditional probability, law of total probability, Bayes' rule, and counting methods; single and multiple random variables (discrete, continuous, and mixed), as well as moment-generating functions, characteristics functions, random vectors, and inequalities. It will be demonstrated how these concepts are applied and communicated in climate change science assessments.

PREREQUISITE: STAT 2210 and ACC 3060

Three hours on-line, three hours laboratory per week

Three semester hours

#### **ACC 4040 COMPUTER PROGRAMMING TO VISUALIZE CLIMATE CHANGE**

Unity3D is computer-gaming software with a powerful cross-platform 3D engine and a user-friendly development environment. Easy enough for the beginner and powerful enough for the expert, Unity is used by everyone who wants to easily create 3D games and applications for mobile, desktop, the web, and consoles. This course provides an introduction to the application of Unity gaming software to climate change visualization. An emerging approach to enhancing participation and awareness building at the local level is the use of 3D landscape visualisation to depict past and future community scenarios. Following an introduction on the basics and essentials of the Unity gaming software—Using the Unity Interface; Essential Unity Concepts such as Game Objects and Components, Prefabs — Concept and Usage, Tags, and Layers; Extending the Unity Editor— students will use the imagery data acquired by the drone in ACC 3040 to develop a 3D interactive sea-level rise tool.

PREREQUISITE: CS 1510, ACC 3040, ACC 3050 and ACC 3060

Three on-line hours, three hours laboratory per week

Three semester hours

# ACC 4060 MEASURING YOUR CARBON FOOTPRINT THROUGH CARBON ACCOUNTING AND CARBON TRADING

Global greenhouse gas emissions are now at a record high, and the world's scientific community agrees that continued unabated release of greenhouse gases will have catastrophic consequences. Many efforts to curb greenhouse gas emissions, both public and private, have been underway for decades, yet it is now clear that collectively these efforts are failing. Critical to any attempt to mitigate greenhouse gas emissions is a clear, accurate understanding of the sources and levels of greenhouse gas emissions. This course will address all facets of greenhouse gas emissions accounting and reporting, and will provide students with tangible skills needed to direct such efforts in the future. Students in this course will gain hands-on experience designing and executing greenhouse gas emissions inventories, employing all necessary skills including the identification of analysis boundaries, acquisition of data, calculation of emissions levels, and reporting of results. As a final exercise, this course will calculate the carbon footprint of individual businesses, companies or public organizations.

PREREQUISITE: ACC 3140 Three hours a week Three semester hours

#### ACC 4070 CLIMATE EXTREMES

Weather and climate extremes are an inherent part of climate. There is overwhelming evidence that the climate and its extremes are changing. As extremes affect every aspect of our society, decision- and policymakers, and stakeholders are increasingly asking for reliable predictions of extremes on time scales from days to seasons and centuries. This course will examine the quality and coverage of the observational data that are used to monitor and understand climate extremes; the factors and mechanisms that determine the location, intensity, and frequency of various climate extremes; and an in-depth examination of Atlantic Region droughts, floods, heavy precipitation events, heat waves, cold spells, tropical and extratropical storms, coastal sea level surges, and ocean waves. Temporal considerations will be examined of the near-term (from a season to a year) to mitigate risks to society and ecosystems, and in the longer term (from a decade to centuries) for effective adaptation planning. Students will learn to read and understand specialized tools such as precipitation intensity, duration, and frequency (IDF) curves used by engineers in the design, operation, and maintenance of municipal water management infrastructure as well as other infrastructure.

PREREQUISITE: ENV 3210 and ENV 3030

Three hours a week
Three semester hours

#### **ACC 4080 CLIMATE CHANGE IMPACTS AND ADAPTATION**

This course follows the steps in conducting a climate change impact assessment as detailed in the Guidelines of the Intergovernmental Panel on Climate Change (IPCC), the leading international authority on climate change. These include how to plan a climate change impact assessment; how to select a method for conducting a climate change impact assessment; how to conduct a climate change impact assessment rapidly; how to use skills developed in ACC 3020 and ACC 3030 to acquire regional scenarios of future climate change and bring these information and tools together into a climate change impact assessment. Typologies of adaptation and possible adaptation strategies for major economic sectors, limits to adaptation, maladaptation, and approaches to adaptation planning will also be covered. The final

course assignment will conduct a rapid assessment of the impacts of climate change and potential adaptation strategies for the PEI economy and ecology, designated for a local business, industry, or government agency.

PREREQUISITE: ACC 3020 and ACC 3030

Three hours a week
Three semester hours

#### **ACC 4090 CLIMATE CHANGE AND SUSTAINABLE TOURISM**

For tourism, climate change is not a remote event, but a phenomenon that already affects the sector and certain destinations in particular, mountain regions and coastal destinations among others. At the same time, the tourism sector is contributing to greenhouse gas emissions (GHG), especially through the transport of tourists. This course will provide the information and tools necessary to: develop an awareness of the environmental, socio-cultural and economic impacts of tourism; acquire knowledge of the possible measures to redress the negative impacts of tourism; develop an understanding and appreciation of environmental sustainability in tourism; develop knowledge and understanding of the concept of ecotourism; and incorporate the principles of sustainable tourism into developing and managing tourism destinations and products.

PREREQUISITE: ACC 3140 Three hours a week Three semester hours

#### ACC 4110 CLIMATE CHANGE AND HUMAN HEALTH

This course explores how human health is shaped by the circumstances in which people are born, grow up, live, work, and age, and how these in turn connect to a wider set of environmental, social, cultural, economic, and political forces. Students will investigate the impact of systems put in place to deal with illness, and examine how understandings of human health are shaped by the cultures we live in and by competing claims about health and disease. Connections are made between climate change and its influence on vector borne diseases; mental health; the effects of extreme heat/cold on chronic health; prenatal health; and food security. Special consideration of First Nations approaches and understanding to human health and community well-being will also be examined.

PREREQUISITE: ACC 2030, recommended SOC 2660 and PHIL 1050

Three hours a week
Three semester hours

#### **ACC 4120 INTERNATIONAL CLIMATE DIPLOMACY**

Canada is signatory to a large number of international environmental agreements that govern environmental management in Canada. These include agreements in the areas of wildlife (Birds, Whaling, International Trade in Endangered Species, Biodiversity), atmosphere (Acid Rain, Climate Change, Stratospheric Ozone Depletion, Toxic Chemicals) and water (Wetlands, Law of the Sea). This course provides an historical and analytical view for understanding international environmental relations, identifies the main actors and their roles, and presents the core theories and facts about international environmental governance. The course examines how governments, international bodies, scientists, activists and corporations address global environmental problems. Specific international environmental agreements and their implications for Canadian environmental management will be examined including

the Vienna Convention for the Protection of the Ozone Layer, the Convention on Long Range Transport of Atmospheric Pollutants, the UN Framework Convention on Climate Change and the Biological Diversity Convention.

As a class exercise, students will take on the role of countries in the United Nations and negotiate a climate agreement.

PREREQUISITE: POLS 2020

Three hours a week

Three semester hours

# Additional Program Courses Delivered by other Departments

### **BIO 1010 CURRENT ISSUES IN ENVIRONMENTAL BIOLOGY**

This course considers environmental problems from a biological perspective. Human ecology, populations, pollution, resource use and other topics are discussed critically.

PREREQUISITES: None

Lectures and field trips to the equivalent of three to six hours a week

**BIO 3270** FIELD COASTAL ECOLOGY

Field coastal ecology is an intensive field-oriented course designed to provide knowledge and experience surveying and monitoring the organisms and habitats best represented in coastal Prince Edward Island. Using a hands-on approach, students are expected to learn and apply the sampling protocols that are most useful to each type of habitat. Although the course will have a broad theoretical component (early daily lectures on community types and sampling design), its main focus will be on activities to be developed in the field and subsequently in the laboratory. These activities include sampling, processing, and identification or organisms collected in the most typical benthic habitats of the Island.

PREREQUISITES: BIO 1010 for students registered in Bachelor of Science in Applied Climate Studies and

Adaptation.

Three hours lecture, three hours laboratory/field trips per week

Three semester hours

### **CHEMISTRY**

# **CHEM 1110 GENERAL CHEMISTRY I**

This course emphasizes the fundamentals of chemistry. Topics include: atoms, molecules and ions; stoichiometry; mass relations; gases and their behaviour; electronic structure and the periodic table; covalent bonding and molecular geometry; and thermochemistry. The laboratory associated with this course stresses stoichiometry, qualitative analysis, atomic spectroscopy and thermochemistry. PREREQUISITE: Grade XII Chemistry, Chemistry 001 or the permission of the Chair in special cases Three lecture hours a week; one three-hour laboratory period or tutorial a week

### **CHEM 2XXX ENVIRONMENTAL CHEMISTRY**

Note: An Environmental Chemistry course for non-Chemistry majors is currently being developed to address interest expressed by students in other programs over the past few years to have the ability to enrol in this course. The modification will support students in the proposed program as well as other students. Prerequisites will be modified to appropriately reflect content and learning outcomes. Currently Environmental Chemistry deals with major topics of concern in environmental chemistry. Emphasis is

placed on the chemistry involved, as well as assessment of the relative hazards and corrective methods available to provide abatement. Topics covered include: atmospheric free radical chemistry, the greenhouse effect, stratospheric ozone, tropospheric chemistry and photochemical smog, the chemistry of natural water systems, acid rain, indoor air quality, sewage and waste management, chlorinated organic compounds, and heavy metals in the environment.

PREREQUISITE: COURSE AND PREREQUISITES CURRENTLY BEING DEVELOPED

Three lecture hours a week TO BE CONFIRMED

COMPUTER SCIENCE

### CS 1510 INTRODUCTION TO COMPUTER SCIENCE I

This course is designed to introduce the fundamentals of Computer Science and prepare students for further studies in this or related fields. Emphasis is on problem solving and software development in a high level object-oriented language such as Java. Topics include computer fundamentals; the programming process; language syntax and semantics; simple data types, classes, methods, expressions, control structures, input/output, arrays, and graphical user interfaces.

PREREQUISITE: Grade XII academic Mathematics.

Three lecture hours and 1.5 hour of laboratory session per week

NOTE: CS 151 and Engineering 131 cannot be double credited.

### **ECONOMICS**

# **ECON 1010 INTRODUCTORY MICROECONOMICS**

This course provides an introduction to the economic analysis of consumer and producer behaviour. Of particular concern is the role of the market in the allocation of resources and the distribution of income, and how these outcomes are affected by imperfections in the market system and by government policy.

PREREQUISITE: None Three hours a week Three semester hours

# **ENGLISH**

### **ENG 2060 CRITICAL APPROACHES TO TEXTS I**

This course approaches literary and cultural texts through a number of critical lenses including reader response, Marxism, feminism, historicism, psychoanalysis, and deconstruction. The course is designed to introduce students to a variety of critical approaches to the interpretation of literary and cultural texts. Three hours a week

### **ENVIRONMENTAL STUDIES**

# **ENV 1010 INTRODUCTION TO ENVIRONMENTAL STUDIES**

This course introduces students to a multidisciplinary and interdisciplinary approach to the study of environmental issues; and emphasizes the interrelationships among the various physical, biological, and human systems. It examines major contemporary environmental issues, such as global warming and land use, and focuses on how these issues are understood and addressed within the natural sciences, social sciences, and humanities.

PREREQUISITE: None

Three hours a week (some field trips may be required)

Three semester hours

# **ENV 2120 EARTH PHYSICAL ENVIRONMENT**

This course will introduce students to the basic 'building blocks' of Earth's physical characteristics, providing a foundation on which to develop more specialist knowledge in their understanding of Environmental Studies. It will examine the geologic and geomorphic cycles, including processes of weathering, erosion, transportation and deposition, and investigate how these create fluvial, glacial, and coastal landforms and impacts on human activity. It also aims to address atmospheric processes and the links between global climate zones and world ecosystems.

PREREQUISITE: ENV 1010 or permission of the instructor

Three hours a week
Three semester hours

## **ENV 3110 UNDERSTANDING CLIMATE CHANGE**

This course introduces students to the science of climate change. Students explore its social and political implications, and examine its impact on daily life by reviewing current scientific data as it relates to vulnerabilities of particular regions. Topics include methods, strategies, and technologies that address climate change, using case studies of adaptive and mitigative programs in North America, with a special emphasis on Canada's climate action plan.

PREREQUISITE: ENV 1010 or 2030

Three hours a week
Three semester hours

# **ENV 3210 NATURAL HAZARDS**

This course provides an introduction to the causes of a variety of natural hazards (tectonic, e.g. earthquakes, tsunamis, and volcanic activity; meteorological, e.g. hurricanes and flooding; and mass movement, e.g. landslides, mudslides, and avalanches) as well as their impact on human activities and the strategies available to predict and manage such events.

PREREQUISITE: ENV 1010 or ENV 2030 or permission of the instructor

Three hours a week
Three semester hours

# **ENV 3420 ENVIRONMENT AND DEVELOPMENT**

This course focuses on environment and development issues in an international, particularly a developing country, context. Issues related to trade, biodiversity conservation, agriculture, climate change, wealth, poverty, population, and gender will be explored.

PREREQUISITE: ENV 101 or permission of the instructor

Three semester hours of credit

### **ENV 3510 SUSTAINABLE COMMUNITY PLANNING**

An overview of how planning tools and practice shape the form of communities, including: (1) Key issues and principles of sustainability at a community scale; as well as related planning approaches; (2) Sustainable community planning approaches and tools for identifying and achieving quality of life, and (3) The components and process of developing an integrated sustainable community plan. Students will learn how to assess community capital, identify and recruit key stakeholders and develop, implement, monitor and evaluate a community plan.

PREREQUISITE: ENV 101 or ENV 203 or permission of the instructor

Three semester hours of credit

### **HISTORY**

# HIST 1010 CANADIAN HISTORY—PRE-CONFEDERATION

This course surveys topics of historical importance in Canadian history up to and including the attainment of Confederation. The emphasis is on the interaction between political events and change in the economy and society. Tutorials examine various historical interpretations of the Canadian experience.

Lecture: Three hours a week
Tutorial: One hour a week

# MATHEMATICS, STATISTICS AND COMPUTER SCIENCE CS 1510 INTRODUCTION TO COMPUTER SCIENCE I

This course is the first of a two-course sequence designed to introduce the fundamentals of Computer Science and prepare students for further studies in this or related fields. Emphasis is on problem solving and software development in a high level object-oriented language such as Java. Topics include computer fundamentals; the programming process; language syntax and semantics; simple data types, classes, methods, expressions, control structures, input/output, arrays, and graphical user interfaces.

PREREQUISITE: Grade XII academic Mathematics.

Three lecture hours and 1.5 hour of laboratory session per week

NOTE: CS 151 and Engineering 131 cannot be double credited.

# MATH 1910 SINGLE VARIABLE CALCULUS I

This course is an introduction to differential and integral calculus of functions of a single variable. The course is intended primarily for majors in the Mathematical and Computational Sciences, Engineering and the Physical Sciences, as well as those planning to continue with further Mathematics courses. The concepts of limits, continuity and derivatives are introduced and explored numerically, graphically and analytically. The tools of differential calculus are applied to problems in: related rates; velocity and acceleration; extrema of functions; optimization; curve sketching; and indeterminate forms. The concepts of definite and indefinite integrals are introduced, and the relation between the two integrals is discovered

via the Fundamental Theorem of Calculus.

PREREQUISITE: Grade XII academic Mathematics and a passing grade on the Assessment Test.

Four lecture hours per week Semester hours of credit: 4

### STAT 2210 INTRODUCTORY STATISTICS 1

The main objective of this course is to introduce the basic concepts of descriptive statistics, statistical inference, and the use of statistical software such as MINITAB to students in any discipline. More time is spent on statistical inference than on descriptive statistics. Topics include frequency distributions, descriptive statistics, rules of probability, discrete and continuous probability distributions, random sampling and sampling distributions, confidence intervals, one- and two-tail tests of hypotheses, and correlation and linear regression.

PREREQUISITE: Grade XII academic Mathematics

Three lecture hours per week

Three semester hours

**NOTE:** Credit will not be allowed for Statistics 2210 if a student has received credit for any of the following courses: Business 2510, Education 4810, Psychology 2710 and Sociology 3320.

### STAT 2220 INTRODUCTORY STATISTICS II

The course builds upon the knowledge developed in Introductory Statistics I and introduces students to statistical techniques commonly used in research. Topics include linear regression and multiple linear regression, residual analysis, simple ANOVA models, categorical data analysis, simple sampling models, and common distributions (including binomial, Poisson, and exponential).

PREREQUISITE: Stat 2210
Three lecture hours per week

### **PHILOSOPHY**

# PHIL 1050 TECHNOLOGY, VALUES, AND SCIENCE

This course explores the connections among technology, human values, and science that are manifested in society, economic systems, and relationships between humans and the natural world. The study of the connections reveal the vast impact that science and technology have on our understanding of the world and our views on the future as well as on personal identity and the human body. It exposes students to critical examination of objectivity in scientific research, progress in technology and science, scientific risk assessment, and genetic engineering. No particular background in science is assumed in this course. Lectures: Three hours a week

# **PHIL 2030 ENVIRONMENTAL PHILOSOPHY**

This course explores the contours of contemporary environmental thought and the diversity of approaches to environmental ethics. Emphasis is on critically understanding historical, cultural and ideological diversity while exploring the moral contours of human-nature interactions, both locally and globally. Topics may include the question of values in nature; environmental movements; aboriginal and postcolonial perspectives; social justice as related to the environment; spirituality; sustainability and consumption; the privatization of environmental morality; inhabiting vs. residing; place, art and environmental education.

PREREQUISITE: None

Three lecture hours a week
Three semester hours

### **PHYSICS**

### PHYS 1210 PHYSICS FOR LIFE SCIENCES I

This course is intended for life science and health science students. Students are introduced to the fundamental concepts of physics and some of their applications to biological systems. Topics include vectors, kinematics, force, energy and power, torque, linear and angular momentum, and fluid mechanics. PREREQUISITE: Proficiency in High School algebra, trigonometry and graphing is expected. It is required that Mathematics 112 or Mathematics 191 be taken at least concurrently. High school physics is strongly recommended.

Three hours lecture, three hours laboratory or tutorial per week

### PHYS 2610 ATMOSPHERIC AND OCEAN PHYSICS

Note: Course proposed by Department of Physics to replace current PHYS 2610 Energy, Environment and the Economy based on desire to update the course and offer it to a broader cross-section of students who are non-Physics majors.

The course is designed to provide students with an understanding of the foundational physics principles 1) that give rise to the complex processes and interactions that occur in the atmosphere and oceans of the Earth and 2) that are fundamental to the design and operation of the instrumentation used to measure and monitor climate properties. The course will explore fluid dynamics needed to describe atmospheric and ocean circulation, and associated interactions with the cryosphere; thermodynamics, heat transfer, cosmic and solar radiation and the global energy balance; the physics of atmospheric aerosols and clouds and their role in the climate system; instrumentation and measurement physics with a focus on temperature, humidity, pressure and solar radiation; computational physics and modeling of climate properties and processes.

PREREQUISITE: Permission of the department

Three hours lecture (seminars and/or field visits to be arranged)

# **POLITICAL SCIENCE**

# POL 2020 THE POLITICS OF CLIMATE CHANGE AND ADAPTATION

This course surveys the political context of climate change: how climate change is understood and responded to by governments, political parties, political movements (both environmental activists and climate change deniers), and the media. Specific topics also covered in this course include international treaties and regulatory agencies dealing with climate change issues, such as greenhouse gas emissions, ocean warming, drought and flood management, coastal erosion, and climate-change refugees.

PREREQUISITE: None

Three lecture hours a week

Three semester hours

### **PSYCHOLOGY**

# **PSYC 1010 INTRODUCTION TO PSYCHOLOGY I**

A general introductory survey of theory and research on basic psychological processes: research methodology in psychology, biological basis of behaviour, sensation and perception, learning and motivation, memory and cognition.

PREREQUISITE: None Three hours a week

# SOCIOLOGY/ANTHROPOLOGY

SOC 2660 SCIENCE, CULTURE, AND SOCIETY

This course considers three centuries of modern Western science as it has been imagined and practised in Europe, initially, and eventually the rest of the globe. It especially considers the relationships between contemporary science and its socio-cultural contexts; discrepancies between the ideal of Science and its actual practice; the role of gender, class, and race in the production of scientific knowledge; and some important debates within the field of science studies, such as the place of subjectivity and objectivity, or whether science is universal or dependent on time, place and field of study.

PREREQUISITE: Anthropology 105 or Sociology 101; or letter of permission from instructor.

Three hours a week
Three semester hours

# UPEI MANDATORY FIRST YEAR COURSE (ONE OF THE FOLLOWING THREE REQUIRED)

UPEI 1010 WRITING STUDIES (Cross Listed with ENGLISH 1010 Writing Studies)

This course offers an introduction to university writing and rhetoric, aimed at the development of clear, critical thinking and an effective prose style.

Three lecture hours per week

Three semester hours

# **UPEI 1020 ENGAGING IDEAS AND CULTURAL CONTEXTS**

This course is for students who want to explore a broad array of issues and 'big' questions that are related to human culture and the natural world from a local to a global perspective. This course emphasizes and cultivates critical inquiry, writing and reading skills through an analysis of texts/topics of contemporary significance.

Three lecture hours per week

Three semester hours

# **UPEI 1030 ENGAGING UNIVERSITY CONTEXTS AND EXPERIENCE**

This is a course for students who seek a well-supported, strongly integrated adjustment to life and learning within the university environment. This course is designed to create a cohesive learning community for students, connecting them to each other and to their instructors in the classroom and beyond. The curriculum focuses on helping students to develop the attitudes, study strategies, and broad communication and research skills they will need to thrive throughout their post-secondary experience.

Three lecture hours per week

Three semester hours

### **PROGRAM DELIVERY**

UPEI has proposed the program as a cohort-based model with an intake of forty high-achieving students per year. Efforts will be made to recruit a globally diverse cohort consisting of PEI students, Canadian, and international students to promote program knowledge transfer and networks across various geographic locations and communities.

Years 1 and 2 of the Bachelor of Science in Applied Climate Change and Adaptation will be delivered through lectures, coursework and labs at the UPEI campus in Charlottetown, PEI. Years 3 and 4 of the Bachelor program will be delivered through small group projects, labs, community learning, field courses—the latter of which will be delivered in partnership with The Smithsonian Institution, a UPEI learning and research partner—at UPEI's satellite campus, the UPEI Greenwich School of Climate Change and Adaptation, being established in the St. Peters area of PEI.

Two WIL experiences for students will take place over eight-week periods during the summers between years 2 and 3, and years 3 and 4. WIL experiences are paid and for credit within the 127- credit Applied degree. They may take place locally, regionally, nationally and, potentially, internationally. The model and delivery of UPEI's Bachelor of Science in Applied Climate Change and Adaptation—which integrates a highly multidisciplinary perspective and strong experiential learning approach—makes the program unique to the region and country.

In development new climate related programming, UPEI has consulted with globally-recognized experts Dr. Francisco Dallmeier, Senior Conservation Biologist, Smithsonian Institution, and Dr. Gordon McBean, Professor and Research Chair, Institute for Catastrophic Loss Reduction and Departments of Geography and Political Science, University of Western Ontario for input and best practices advice.

ATIA - 20(1)(b)
ATIA - 20(1)(c)
ATIA - 20(1)(d)

# Scharf, Kelsey (INFC)

From:

Scharf, Kelsey (INFC)

Sent:

March 20, 2019 10:47 AM

To:

Chung-How, Catherine (INFC)

Subject:

FW: UPEI Financing option

Hi Catherine,

Just thought I'd add the percentage to the table. I made the revision to the table below.

Thanks,

Kelsey

From: Chung-How, Catherine (INFC) Sent: March 20, 2019 9:54 AM

To: Scharf, Kelsey (INFC) <kelsey.scharf@canada.ca>; Villeneuve, Elizabeth (INFC) <elizabeth.villeneuve@canada.ca>

Subject: RE: UPEI Financing option

Thank you Kelsey. This looks good.

# **Catherine**

Tél: 613-960-2513

From: Scharf, Kelsey (INFC)
Sent: March 20, 2019 9:01 AM

To: Chung-How, Catherine (INFC) < catherine.chung-how@canada.ca >; Villeneuve, Elizabeth (INFC)

<elizabeth.villeneuve@canada.ca>
Subject: UPEI Financing option

Submitted to INFC	Alternative Scenario
Proposed Capital Financing: Infrastructure Canada: \$10,000,000 University of Prince Edward Island: \$4,300,000 Atlantic Canada Opportunities Agency: \$4,000,000 TOTAL: \$18,300,000	

ATIA - 13(1)(c)

ATIA - 20(1)(b)
ATIA - 20(1)(c)

# ATIA - 20(1)(d)

# **Kelsey Scharf**

Analyst | Analyste Program Operations Branch | Direction générale des opérations Infrastructure Canada kelsey.scharf@canada.ca

**TOTAL INFC Contribution: \$10,000,000** 

Tél: 613-948-4487

# Scharf, Kelsey (INFC)

From:

Chung-How, Catherine (INFC)

Sent:

March 20, 2019 3:42 PM

To:

Syed, Fariya (INFC)

Cc:

Scharf, Kelsey (INFC); Villeneuve, Elizabeth (INFC)

Subject:

FOR ACTION: UPEI Financing option

Hi Fariya,

Here is the message for JF to send to ACOA. Let me know if you need more details. Thanks

# Good afternoon

As a follow-up to our meeting on the UPEI Climate change centre project, here is the proposed option. The project is eligible under the Innovation category under the PTIC-NRP Program and UPEI will be eligible for 33.3 % of the eligible costs of the project. Here is the proposed option without ACOA funding.

Proposal submitted to INFC	Alternative Scenario
•	
Brancing Conital Financing	
Proposed Capital Financing:	
Infrastructure Canada: \$7,300,000	
University of Prince Edward Island: \$4,300,000	
Province of PEI: \$3,000,000	
Atlantic Canada Opportunities Agency:	
\$3,700,000	
73,700,000	
TOTAL requested INFC Contribution:	
\$7,300,000	
<u></u>	

# Olson, Spencer (INFC)

From:

Chung-How, Catherine (INFC)

Sent:

April 15, 2019 2:03 PM

To:

Olson, Spencer (INFC)

Subject:

see breifing note

**Attachments:** 

DM Brief - U PEI Climate Adaptation -Feb 2019.doc

FYI.

# **Catherine Chung How**

Manager, North/Atlantic/Ontario Directorate Program Operations Branch Infrastructure Canada / Government of Canada <u>catherine.chung-how@canada.ca</u> / Tel: 613-960-2513

Gestionnaire, Direction régionale du Nord/Atlantique/Ontario Opérations des programmes Infrastructure Canada / Gouvernement du Canada catherine.chung-how@canada.ca: Tél: 613-960-2513



PROTECTED B

# NOTE TO THE DEPUTY MINISTER

# TO DISCUSS THE REQUEST FOR FUNDING OF THE UNIVERSITY OF PRINCE EDWARD ISLAND CANADIAN CENTRE FOR CLIMATE CHANGE AND ADAPTATION PROJECT

# **MEETING DETAILS**

- DATE/TIME:
- LOCATION:
- PARTICIPANTS:
  - Kelly Gillis, Deputy Minister of Infrastructure and Communities
  - Marc Fortin, ADM, Program Operations, North/Atlantic Region
  - Jean-Francois LaRue, DG, Program Operations, North/Atlantic Region
  - Catherine Chung-How, Manager, Program Operations, North/Atlantic Region

# **ISSUE**

 To discuss a re-submission of the proposal submitted by the Province of Prince Edward Island (PEI), which involves the construction of a new facility at the University of PEI (UPEI) called the Canadian Centre for Climate Change and Adaptation (the Project) that will house a new academic program.

# **KEY CONSIDERATIONS**

- The Province of Prince Edward Island (PEI) prioritized the Project under the New Building Canada Fund-Provincial-Territorial Infrastructure Component-National and Regional Projects (NBCF-PTIC-NRP) prior to the March 31, 2018, deadline.
- The Province submitted the business case for the Project in June 2018 under the Innovation subcategory of NBCF-PTIC-NRP. UPEI was requesting funding of up to \$15,000,000 which represents approximately 50 percent of the total costs of the Project. Two other federal departments: Environment and Climate Change Canada (ECCC) and Atlantic Canada Opportunities Agency (ACOA) were also involved, which was a stacking issue.
- Under NBCF-PTIC-NRP, the maximum federal cost-sharing and stacking limit is up to one-third (33.33 percent) of the total eligible costs of a project. The recipient is requesting approximately 50 percent which is above the cost-sharing limit.



# PROTECTED B

 In February 2019, PEI re-submitted the project with a revised project cost including a revised federal contribution. This time only ACOA contribution was included in this new proposal and the project costs are reduced.

Sources of Funding	Amount
Infrastructure Canada: New Building Canada	
Fund	
Atlantic Canada Opportunities Agency	
Province of Prince Edward Island	
Proponent (University of Prince Edward	
Island) – Fundraising and donations	
Total Project Costs	

Also, based on a preliminary review of the project costs, the federal contribution is still
above the maximum federal cost-sharing and stacking limit of one-third (33.33 percent).
 Some of the costs listed in the business case would **not be eligible** expenses under the
program:



# Points to register

- Under NBCF-PTIC-NRP, the maximum federal cost-sharing and stacking limit for UPEI is up to one-third (33.33 percent) of the total eligible costs of a project.
- Based on the information currently submitted to, the total eligible costs for the project would be: \$14,600,000 and the total federal share cap is 33.3 per cent under NBCF-NRP.



 During a call with ACOA, it indicated that it had not made a firm commitment to UPEI yet at this point.

ACOA has recently received an application

from the proponent and is currently reviewing the application.

ATIA - 21(1)(a) ATIA - 21(1)(b)

# **PROTECTED B**

• Finally, INFC had previously explored the possibility of funding the Project under the Investing in Canada Infrastructure Program (ICIP) with the Province. The Project would not be eligible under the ICIP.



Attachment:

Annex A – Synopsis of project

# Synopsis of Project

The University of Prince Edward Island (UPEI) has submitted a business case for the construction of a new 36,000 square foot facility called the Canadian Centre for Climate Change and Adaptation at a site in St. Peters. PEI and will include four Research Centres of Excellence, multipurpose space, innovation collaboration space, student residence, storage, repair shop, greenhouses and common areas.

The four research Centre's of excellence within the Centre include:

- Data and Policy Analysis for Transition to Low-Carbon Economies;
- Coastal Systems Impacts;
- Clean Technology Innovation in Support of Agriculture and Aquaculture; and
- Climate Change and Human Health.

The Project will be housed at an UPEI satellite campus to be located in St. Peters, PEI. This location provides an advantage to researchers, students, and partners with its close proximity to protected land and unique ecosystems within Parks Canada's National Park at Greenwich.

Within the Canadian Centre for Climate Change and Adaptation, UPEI will deliver higher learning programs focused on developing much needed climate change professionals, researchers, and decision makers for the future. UPEI recently approved the Bachelor of Science in Applied Climate Change and Adaptation Program, and has the Masters in Climate Change and Adaptation that is in development. This program will serve as the academic foundation upon which new research, teaching and academic programming contributing to leadership and innovation in public policy thinking will take place.

Graduates of the program will have relevant knowledge and skills to compete for a diverse range of career opportunities related to science, social, and policy aspects of climate change in areas ranging from entrepreneur-based businesses to all levels of government. The program will also provide graduates with entry level requirements needed for many professional and graduate programs in related fields, including areas such as climate related science programs, meteorology, policy, law, public administration, data analytics, and more.

The Proponent is an eligible recipient (a public institution delivering post-secondary courses or programs that lead to recognize and transferable post-secondary credentials) under the Provincial-Territorial Infrastructure Component – National and Regional Projects (PTIC-NRP).

The Project appears eligible under the Innovation category, specifically the subcategories:

- Post-secondary research and development laboratories and Centre's, and related teaching facilities; and
- Office space for the purpose of conducting research and development.

# Olson, Spencer (INFC)

From: Sent: To: Subject: Attachments:	Alex Dalziel <jadalziel@gov.pe.ca> April 15, 2019 2:08 PM Olson, Spencer (INFC) UPEl Project - Feb 15 revision (1/3) NRP Business Case UPEI_CCCA_Part1.pdf</jadalziel@gov.pe.ca>
Hi Spencer,	
UPEI's most recent revision is atta	ached. Parts 2 and 3 to follow.
Alex	
Statement of Confidentiality	
individual or organization. If you are not the intended recipient, yo	ents) may contain confidential or privileged information intended for a specific have received this communication in error, please notify the sender immediately. If you are not authorized to use, disclose, distribute, copy, print or rely on this email, and I from your entire computer system.
Déclaration de confidentialité	
ou d'un organisme en particulier. l'expéditeur immédiatement. Si vo	s annexes) peut contenir des renseignements confidentiels à lintention d'une personne Si vous avez reçu la présente communication par erreur, veuillez en informer ous n'êtes pas le destinataire prévu, vous n'avez pas le droit d'utiliser, de divulguer, de er ce courriel ou encore de vous en servir, et vous devriez le supprimer complètement

# BUSINESS CASE FOR FUNDING FOR CANADIAN CENTRE FOR CLIMATE CHANGE AND ADAPTATION UNDER THE NEW BUILDING CANADA FUND: PROVINCIALTERRITORIAL INFRASTRUCTURE COMPONENT, NATIONAL/REGIONAL PROJECTS

SUBMITTED UNDER INNOVATION SUBCATEGORY

Amended Business Case February 13, 2019

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# 1.0 Project Description

# 1.1 Project Name and Category

A proposal of the project "Canadian Centre for Climate Change and Adaptation" is being submitted under the Innovation subcategory of the New Build Canada Fund Provincial-Territorial Infrastructure Component, National/Regional Projects.

# 1.2 Project Design

The Canadian Centre for Climate Change and Adaptation hosted by the University of Prince Edward Island (UPEI) will work collaboratively to build capacity for evidence-based decision making needed to inform policy, advance research, and accelerate innovation to enable Canada's effective transition to a clean growth economy.

The Canadian Centre for Climate Change and Adaptation is built on a model of strong research and higher learning, hallmarked by purposeful collaboration with communities, industry, and governments.

Within the Centre, UPEI will lead four Research Centres of Excellence in:

- Data and Policy Analysis for Transition to Low-Carbon Economies,
- Coastal Systems Impacts,
- Clean Technology Innovation in Support of Agriculture and Aquaculture, and
- Climate Change and Human Health.

Together, the Research Centres of Excellence will form a cluster of discovery and new knowledge acquisition within the Canadian Centre for Climate Change and Adaptation. By leveraging existing strengths of the UPEI Climate Research Lab (a globally recognized climate research centre that has drawn the praise of research intensive institutions such as MIT and Stanford University), the climate change and adaptation knowledge cluster will be further developed through strong networks and timely partnerships to ensure the application of new knowledge and innovation within our communities.

Within the Canadian Centre for Climate Change and Adaptation, UPEI will deliver higher learning programs focused on developing much needed climate change professionals, researchers, and decision makers of the future, through UPEI's recently approved Bachelor of Science in Applied Climate Change and Adaptation, as well as a Master in Climate Change and Adaptation that is in development.

The Canadian Centre for Climate Change and Adaptation's commitment to scientific discovery, application, and new climate change knowledge will provide Canada with the capacity to deliver climate change solutions needed to advance Canada's clean growth economy for the prosperity and well being of all our citizens. A more detailed project description is contained in Appendix G Canadian Centre for Climate Change and Adaptation Business Plan (original business plan, dated September 2017).

A new 45,000 square foot facility will be constructed at a site in St. Peters, Prince Edward Island and will include four Research Centres of Excellence, multipurpose space, innovation collaboration space, student residence, storage, repair shop, greenhouses and common areas.



Common area space within the Centre will be designed to encourage faculty, researchers, students, and partners to interact, fuelling innovation and integration of research focus areas.

In keeping with climate action priorities, it is proposed that the new Centre be constructed and operated in a sustainable manner. The Centre's highly efficient design features will include renewable energy sources such as wind and solar, geothermal heating and a green roof.

A Class D concept budget prepared by Brighton Construction Inc. can be found in Appendix E.

# 1.3 Land

UPEI has land available in the St. Peters area of rural PEI to house the new facility. Land specifications, site map, and aerial images can be found in Appendix A.

# 1.4 Project Timeline

It is estimated that construction would commence upon approval of funding in the Summer of 2019 and be completed for use by September 2020.

UPEI UNIVERSITY

# 2.0 Alignment with Innovation Subcategory

# 2.1 Vision and Strategic Priorities

The Canadian Centre for Climate Change and Adaptation will be a leader in climate change adaptation and resilience by building capacity for evidence-based decisions that are needed to inform policy, advance research, and accelerate innovation for the prosperity and well-being of all citizens.

The strategic priorities of the Canadian Centre for Climate Change and Adaptation include:

- to provide government and industry with next generation professionals and researchers who have the skills and experiences that are required to help communities remain sustainable in the face of climate change (from the perspectives of economic, well-being/health, and culture);
- to deliver truly unique experiential learning and discovery opportunities for students, faculty, and visiting researchers who will have a direct impact on community, industry, and public policy;
- to work with businesses, industry, communities, and government to determine the solutions to climate; and
- change challenges that will inform public policy in a manner that supports sustainable communities, adaptable sectors, and entrepreneurial developments, enabling transition to a clean growth economy.

The Research Centres of Excellence within the Canadian Centre for Climate Change and Adaptation will build capacity in four core areas:

**Data and Policy Analysis for Transition to Low-Carbon Economies** 

**Coastal Systems Impacts** 

Clean Technology Innovation in Support of Agriculture and Aquaculture

**Climate Change and Human Health** 

The Research Centres of Excellence will leverage UPEI's **proven track record** in mobilizing new knowledge in climate change, working with local, national, and international communities, as well as **interdisciplinary research** through collaboration with existing and complementary expertise at UPEI, and climate change networks around the world.

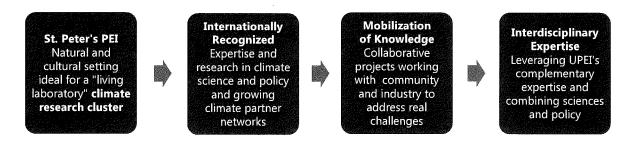
UPEI UNIVERSITY ISLAND

# 2.2 Proposed Direction

UPEI is proposing to establish the Canadian Centre for Climate Change and Adaptation, including four Research Centres of Excellence to support the creation of new climate change knowledge, adaptation, and innovation needed to accelerate Canada's transition to a clean growth economy. This transition will enable the promotion of the productivity and health of Canadian communities over the long-term.

The proposed Canadian Centre for Climate Change and Adaptation will mobilize new knowledge and expertise that is applied locally and adapted at national and global levels. The enhanced direction and focus on climate change for UPEI, as outlined in this document, exemplifies the four pillars of the University that build on core strengths: Student Experience, Vibrant Communities, Exploration and Discovery, and Long-term Sustainability.

The Research Centres of Excellence in Climate Change and Adaptation will be housed within the Canadian Centre for Climate Change and Adaptation hosted by UPEI and located in St. Peter's, PEI. Researchers, students, and partners will have ready access to the internationally-recognized UPEI Climate Research Lab, as well as access to outstanding global climate partner networks, and researchers in diverse areas of climate and climate-related areas of expertise being developed through new higher learning and research programs. The Centre's location provides an advantage to researchers and students with its close proximity to protected land and unique ecosystems within Parks Canada's National Park at Greenwich. Its location in Eastern PEI further supports the University's strategy to develop transformative and immersive climate change programs 'in the field' with strong collaboration and community outreach.





# 3.0 Project Outcomes and Benefits

The Canadian Centre for Climate Change and Adaptation proposes to mobilize new knowledge and expertise in climate change through the advancement of higher learning, building research expertise and supporting evidence-based decision making, and accelerating innovation in relation to climate change, adaptation, and resilience. This will be done through a highly-collaborative approach involving undergraduate and graduate students, expert faculty, and visiting researchers, working with community, industry and government. These outcomes are anticipated to generate benefits on a local and national scale with the potential for lessons learned to be applied internationally.

	Expected Outcomes
Advancement of Higher Learning	Foster the development of the next generation of climate leaders who will emerge from their studies to excel and contribute to the betterment of our local and global communities
	Provide students with unique, experiential 'real world' learning opportunities in climate change
Building Research Capacity in Climate	Improve assessment of climate risk and impact in relation to key sectors and industries (such as agriculture, aquaculture, tourism, construction), critical infrastructure, and impacts such as coastal erosion, that are essential to the prosperity and growth of the regional economy
Change and Adaptation	Improve observation, monitoring, and surveillance networks that directly impact climate related health, wildlife and ecosystem health, food production and supply (climate science, climate observations, scenarios of future climate, mapping and visualization of climate change, climate mitigation and adaption, economics of climate change, etc.)
Building Capacity in	Build capacity in the <b>development of government policies and actions</b> in long-term climate mitigation and adaptation, and economic investment in infrastructure
Evidence- Based Decision Making	Build capacity to support the sustainability of agriculture, aquaculture, tourism and other key economic sectors in relation to climate change mitigation and adaptation, and realize economic opportunities related to new technology adoption
·	Build capacity to advance the knowledge of municipalities and industry professionals including engineers, land-use planners, natural resource managers, and others in climate change
Acceleration of Innovation	Contribute to the development of a "clean growth economy" through higher learning and research, as well as advancing economic knowledge of climate change impacts
	Provide vital support for private businesses, entrepreneurs, and start-ups that is needed to transform knowledge and research into action to support clean technology development
	Support key economic sectors in realizing economic opportunities related to new clean growth technology adoption, scalable technologies

UPFT UNIVERSITY

3.1 Supporting Climate Change Adaptation in the Community and a Clean Growth Economy
This transformative, unique in Canada approach to climate change and adaptation research will greatly
benefit local, regional, and national economies, in addition to the long-term sustainability of
communities and the well-being of citizens.

# 3.2 National and Regional Relevance

There are significant benefits of critical magnitude and relevance directly associated with the proposed Centre and research cluster. These include, but are not limited to:

- growth in the skills, knowledge, and understanding necessary to build capacity in decision
   making and policy development in sectors to Atlantic Canada this cannot be understated
- further advancement of knowledge, adaptation, and mitigation strategies working with First
   Nations and populations that are particularly vulnerable to climate change (such as Lennox Island, PEI)
- development of much needed collaborative projects with industry to address challenges and opportunities through development and adoption of new scalable and practical clean technology products and solutions that will lead to entrepreneurial ideas and advances in climate change mitigation, resilience, and adaptation strategies greatly improved 'local' knowledge about climate change impact and resilience—which research shows the to be of critical importance in climate change adaptation to support a clean growth economy and related economic benefits associated with this high growth sector (direct, indirect and induced spin offs and good jobs for Canadians)
- capacity building and knowledge acquisition among land use planners, engineers and other professional and industry sectors responsible for considerable planning, decision making, jobs and prosperity, and overall economic impact
- research development and dissemination of information to support the sustainability of agriculture, fisheries, aquaculture, tourism and other traditional and emerging sectors that are key to economic prosperity and quality of life
- positive impacts to address national concerns about the growing cost of climate change on Canada's prosperity, public health, and in coastal areas. (The National Round Table on the Environment and the Economy, a government-funded think tank, estimated the cost of climate change for Canada at \$5 billion per year in 2020 increasing to between \$21 billion and \$43 billion per year by 2050. Source: http://www.cbc.ca/news/politics/climate-change-could-costbillions-a-yearby- 2020-1.1097373)
- acting on climate change through adaptation and mitigation strategies is a key way to drive down costs and will reduce associated risks including to critical infrastructure, food security, human health, and economic growth – these areas are priorities nationally and internationally
- the continuation of a strong and vibrant university generates direct, indirect, and induced
  economic spin off in the provincial economy including with the attract of leading researchers to
  live and work in Prince Edward Island



# 3.3 Community Relevance in Rural PEI

Positive impacts on the community of St. Peters and the surrounding area include, but are not limited to:

- direct, indirect, and induced economic spin off as a result of more dollars spent in the rural community
- greater diversity in the community as a result of researchers, faculty, visiting researchers, and students of different backgrounds, experiences and cultures from around the world interacting with local residents
- increased visitation in the longer-term from visitors, development of businesses to deliver products and services, and potential experiential tourism offerings through Parks Canada a priority of the Prince Edward Island tourism industry
- 3.4 New Climate Change and Adaptation Higher Learning Programming within the Canadian Centre for Climate Change and Adaptation

Within the proposed Canadian Centre for Climate Change and Adaptation UPEI's Department of Science and School of Graduate Studies will deliver highly innovative and relevant programming a Bachelor of Science in Applied Climate Change and Adaptation and a Master of Science in Climate Change and Adaptation.

Approved by the UPEI Board of Governors, UPEI Senate, and Maritime Provinces Higher Education Commission (the regional authority for post-secondary programming quality assurance), UPEI's new Bachelor of Science in Applied Climate Change and Adaptation will examine theoretical aspects of how science, policy, and human populations interact in creating and solving climate change challenges, while engaging students in hands-on, technology-based learning.

The UPEI Bachelor of Science in Applied Climate Change and Adaptation is purposely innovative in design and delivery. In keeping with priorities outlined within the UPEI Strategic Plan and UPEI Academic Plan, the program strongly aligns with UPEI's vision to be a leader in experiential learning opportunities that encourage students to develop to their full potential in both the classroom and the community.

To make it unique to the region and country, UPEI brought together best practices of other successful climate programs throughout North America and Europe. The University also considered recent evidence-based results of the MPHEC Class of 2012 Maritime University Graduates: Pathways to Employment survey.

This survey shows strong progression of graduates from Applied Arts and Sciences and Professional programs moving directly into the workforce after graduation. In addition, graduates of this group have demonstrated strong interest in pursuing a second credential or further studies—most notably, graduate studies.

The main objectives of the program include: developing climate leaders who understand essential biological and physical sciences and their processes in relation to climate; understand the broader social and economic policy implications of climate change; possess analytic skills that enable them to interpret, understand, and predict climate impacts and climate models; develop critical thinking skills to effectively evaluate evidence and processes, and make sound decisions on adapting to climate change; and



continually develop their teambuilding, communication, and digital literacy skills that enable them to effectively collaborate and communicate.

The result is a program that will examine theoretical aspects of how science, policy, and human populations interact in creating and solving climate change challenges, while engaging students in hands-on, technology-based learning in an experiential manner beyond the traditional classroom and textbooks. For example, students will learn to use state-of-the-art drone technology and computer game programming surveillance instrumentation to develop skills to assess the vulnerability, impacts, and adaptation to climate change. In addition to flying and immersing drones to gather data, students will learn, among other outcomes, to:

- ✓ use GIS to map and visualize climate change;
- ✓ analyze climate change in a way that takes future industry and community impacts real and tangible;
- √ design and set up climate stations;
- ✓ participate in United Nations-style climate governance summits; and
- ✓ examine paleoclimatalogical indicators of climate.

Students will further benefit from the program's concentration on hands-on learning and skill development through a high degree of small group exercises/projects, laboratory work, fieldwork, community engagement, and field courses — including two senior level field courses delivered by UPEI's educational and research partner The Smithsonian Institution.

Graduates of the program will have relevant knowledge and skills to compete for a diverse range of career opportunities related to science, social, and policy aspects of climate change in areas ranging from entrepreneur-based businesses to all levels of government. The program will also provide graduates with entry level requirements needed for many professional and graduate programs in related fields, including areas such as climate related science programs, meteorology, policy, law, public administration, data analytics, and more.

# A UNIQUE DELIVERY MODEL

- Applied learning
- Selective domestic and international student recruitment
- 'Living Laboratory' in rural Greenwich, PEI
- Problem solving with community and industry projects
- Student work-integrated-learning placements with organizations such as Parks Canada and other stakeholders
- International partners and recognition
- Next generation leaders in climate change and adaptation

Summer work-integrated-learning (WIL) opportunities with industry and government organizations will also differentiate the program. It is UPEI's intention that all students within the program will be employed during two summer WIL sessions, during which students are paid and earn program credits. A



number of government and industrial partners have expressed interest in participating in climate-related WIL to advance their respective organizations' objectives while contributing to development of future skilled labour. The real-world experience gained by students will assist them in securing jobs upon graduation. The strength of the program's WIL aspect will aid in employer and community partnerships as it encourages the competencies and networks needed to "...build a highly skilled and productive labour force for an innovative, strong, and growing economy." (Canadian Chamber of Commerce on the benefits of WIL).

UPEI currently delivers an interdisciplinary liberal arts and science Environmental Studies program that offers a broad base of Arts, Science, and Business courses to provide students with the ability to understand environmental connections across fields. UPEI's Bachelor of Science in Applied Climate Change and Adaptation will build increasingly concentrated knowledge and application of fundamental sciences, incorporate new fields of study (such as data analytics focused on climate change, geographic information systems, and climate coastal sciences), and use technologies previously not used within UPEI curriculum, to leverage existing Environmental Studies strengths within the first two years of the new program. This complementary model will serve to build an emerging cluster of expertise at UPEI, and an enhanced level of faculty collaboration across disciplines.

Together, the existing Bachelor of Environmental Studies and new Bachelor of Science in Applied Climate Change and Adaptation will enable UPEI to develop a robust climate-concentrated undergraduate focus that will serve to develop career-ready professionals and a new generation of graduate students with broad environmental awareness and specialization in climate change science.



# 4.0 Recipient

The Canadian Center for Climate Change and Adaptation will be established, operated, and maintained by the University of Prince Edward Island. The University of Prince Edward Island is governed by a Board of Governors and a Senate, instituted under the terms of the Prince Edward Island government's University Act.

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UPEI UNIVERSITY

# 5.0 Project Governance

The University of Prince Edward Island has established a Project Management Team responsible for governing the project from the planning stage through to the end of construction. The Project Management Team composition can be found in Appendix B.

UPEI will hire a construction management firm to manage the overall construction project. They will report to the Project Management Team and will be responsible for managing the project schedule, subcontracting and supervising resources for the project, project communications, managing project risks and keeping the project on time and budget.

UPEI will hire a capable financial management team to oversee the financial aspects of the capital project. They will continuously monitor actual costs to budget and work with the construction manager to make adjustments as required. They will be responsible for managing the cash flow of the project, receiving and processing invoices after approval by the construction manager, reporting to Senior Management, funders and other sources of financing during the project.

Subsequent to project completion, ongoing asset management and planning will be the responsibility of <u>UPEI Facilities Management</u>. Facilities Management maintains specific policies at UPEI, including indoor air quality, storage, signage, maintenance and painting. Maintenance priorities are defined under the <u>Work Order Priorities policy</u>, and maintenance is performed by the Facilities Management Maintenance Division.

UPEI UNIVERSITY

ATIA - 13(1)(c) ATIA - 20(1)(b)

ATIA - 20(1)(c)

ATIA - 20(1)(d)

# 6.0 Financial

6.1 Proposed Project Costs and Financing

Land and site improvement costs are estimated at a and will consist of activities required to prepare the land for the Centre's construction, including earthwork, landscaping, and paving.

In keeping with climate action priorities, it is proposed that the new Centre be constructed and operated in a sustainable manner, meeting or exceeding the energy efficiency requirements of the Model National Energy Code for Buildings. The Centre's highly efficient design features will include renewable energy sources such as wind and solar, geothermal heating and a green roof. UPEI engaged

to prepare Class D concept budgets for the new Centre and residence. The construction budget estimate is per square foot for the Centre, exclusive of specialized technology and equipment. On this basis, the capital costs for the construction of the building are estimated to be Although the estimated cost is significant, investing in energy efficiency up front makes the Centre more financially sustainable in the long-term, and sends a clear environmental message that is core to the overall purpose of the Centre.

Access to specialized equipment and leading-edge technology is vital to administering educational programming and advancing research in the area of climate change and adaptation. Through extensive consultation with faculty and industry experts, UPEI has identified the technologies and equipment required for the Canadian Centre for Climate Change and Adaptation and Research Centres of Excellence. Specialized equipment and leading-edge technology are estimated to be Examples of technologies and equipment include small, unmanned air vehicles (sUAVs), aerial senor packages, real-time kinetic global positioning systems, field monitoring kits and supplies, research boat, trailer, backup generator and state-of-the-art communications infrastructure, computer equipment, networks, servers, and security systems for data storage and management in rural PEI.

Table 1: Detailed Project Cost Table

	Description of Activities	Eligible Costs Ineligible Total Project Costs Costs
Land improvements and site customization Building	St. Peters and Greenwich area of rural PEI Centre for Climate Change and Adaptation. Capital cost estimate provided by	
	February 2019.	
Specialized Equipment and Leading-Edge Technology Total Estimated Costs	Please refer to Appendix E for a detailed list	



ATIA - 20(1)(b) ATIA - 20(1)(c) ATIA - 20(1)(d)

For the purpose of budgetary and planning purposes, the proposed financing structure is as follows (Table 2):

Table 2: Sources of Funding

Funding Source	Fund	ng Roquest
Infrastructure Canada – Non-repayable capital contribution	\$	
Atlantic Canada Opportunities Agency – Non-repayable capital contribution		
Province of Prince Edward Island – Non-repayable capital contribution		
UPEI – Fundraising and Donations		
Total Proposed Project Financing	\$	

An estimated expenditure profile reflecting total eligible expenditures, by fiscal year and by funding source is illustrated in Table 3.

Table 3: Estimated Project Cash Flow (Based on Total Eligible costs, in dollars)

Funding Source 2019-2020 2020-2021 Total infrastructure Canada – Non-repayable capital contribution
Atlantic Canada Opportunities Agency – Non- repayable capital contribution
Province of Prince Edward Island — Non-repayable capital contribution
JPEI – Fundraising and Donations
Total Proposed Project Financing

# 6.2 Operations

Detailed financial projections illustrating UPEI's capacity to operate and maintain the Centre on a sustainable, long-term basis can be found in Appendix F. The following is an overview of key operational assumptions and financial impact of alternative approaches.

# Number of Students

UPEI will intentionally maintain a competitive and capped enrollment to enhance the quality of education and the exclusivity of its Bachelor and Master programs. Maintaining smaller cohorts of students will allow for students to have greater access to experienced faculty and resources, while at the same time creating a highly-collaborative learning environment.



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# 7.0 Legal

Appendix C contains a letter from the UPEI Comptroller, Tara Judson, stating the project will adhere to all applicable legislation and that all necessary permits and authorizations required for the project will be obtained.

The completed and signed Environmental, Aboriginal Consultation and Project Location Questionnaire can be found in Appendix D.

The University of Prince Edward Island has <u>documented purchasing guidelines</u> which will be followed for purchases related to this project. Construction over \$100,000 requires a formal request for proposal or request for quotation. Costs under \$100,000 are subject to a minimum of two documented competitive quotations.

UPEI UNIVERSITY
ISLAND

# 8.0 Risk Mitigation

UPEI has established a Project Management Team (see Appendix B) and will hire a construction management firm to manage the overall construction project. They will be responsible for managing the project schedule, subcontracting and supervising resources for the project, project communications, managing project risks and keeping the project on time and budget.

UPEI will hire a capable financial management team to oversee the financial aspects of the capital project. They will continuously monitor actual costs to budget and work with the construction manager to make adjustments as required. They will be responsible for managing the cash flow of the project, receiving and processing invoices after approval by the construction manager, reporting to Senior Management, funders and other sources of financing during the project.

UPEI will enter legally-binding contracts with project contractors. Contracts will include appropriate holdbacks as per the Prince Edward Island Mechanics' Lien Act. Furthermore, UPEI will require contractors to provide construction bonds as a type of surety to protect against any disruptions or financial loss as a result of the contractors' failure to meet contract specifications.

UPEI UNIVERSITY ISLAND

Appendix A: Land Specifications, Site Map and Aerial Images



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File No. 17-11-004C-Revised

#### APPRAISAL OF



#### LOCATED AT:

St. Peters Bay, PE, C0A

FOR:



AS OF:

November 14, 2017

BY:



DEVELOPMENT AND ALUMNI ENGAGEMENT

550 University Avenue, Charlottetown, Prince Edward 1812 and C1A 4P3 T (902) 566-0615 F (902) 566-0782 E dev-alumni@upei.ca upei.ca/friends



File No. 17-11-004

### AltusGroup

APPRAISAL OF



Vacant lot

#### LOCATED AT:

St. Peters Bay, PE, C0A

FOR:



AS OF:

November 14, 2017

BY:

Charlottetown, PE.

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File No. 17-11-004B

### **Altus** Group

APPRAISAL OF



Vacant Lot

LOCATED AT:

St. Peters Bay, PE, C0A

FOR:

AS OF:

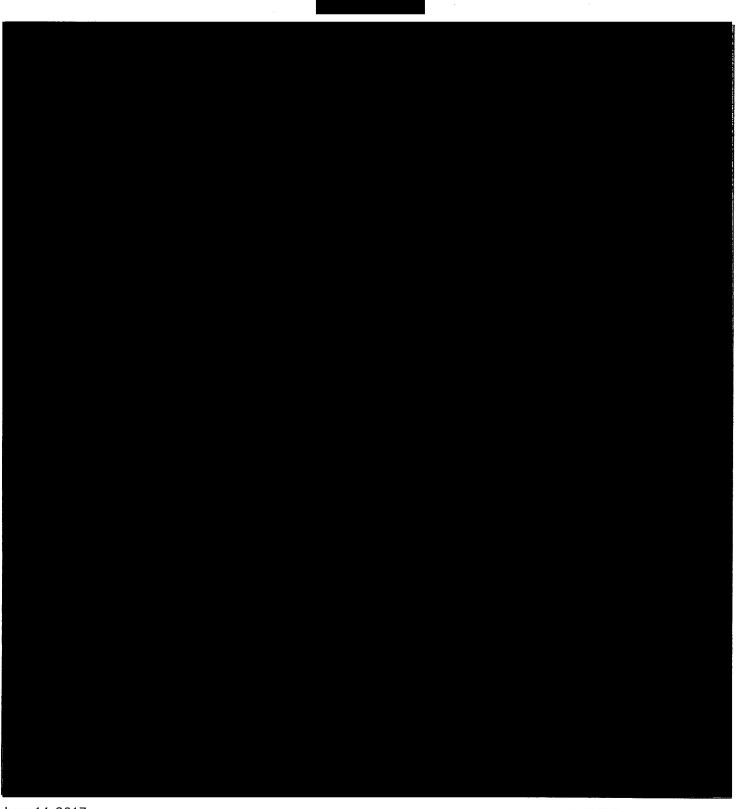
November 14, 2017

BY:

Charlottetown, PE.

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ATIA - 20(1)(c)
ATIA - 20(1)(d)



June 14, 2017

Highway No Open Water or Marsh Component

Secondary Open Water or Marsh Component

Street Salt or Brackish Marsh
Unpaved Sand Dune
Property Watercourse

Land Locked Pond Waternames

> DCLE GIS Section - 2017 This map is not a legal survey; may not print to scale.

Appendix B: Project Management Team





#### Canadian Centre for Climate Change and Adaptation

#### Project Management Team

Ms. Jackie Podger, Vice-President, Finance and Administration

Dr. Robert Gilmour, Vice-President, Academic and Research

Dr. Adam Fenech, Director, Climate Lab

Ms. Tara Judson, Comptroller

Mr. Greg Clayton, Director, Facilities Management

Ms. Charlotte McCardle, Manager, Strategic Development & Implementation

Ms. Myrtle Jenkins-Smith, Executive Director, Development

Appendix C: Comptroller Letter

UPEI UNIVERSITY ISLAND



#### Office of the Comptroller

May 24, 2018

To Whom It May Concern:

#### Re: Project Proposal - Infrastructure Canada (INFC)

I acknowledge that the project will adhere to all applicable legislation and that all necessary permits and authorizations required for the project will be obtained

Sincerely,

Tara Judson
Comptroller, UPEI

550 University Avenue, Charlottetown, Prince Edward Island, Canada C1A 4P3 T (902) 566-0474 | F (902) 566-0742 | upei.ca/vpfinance/comptroller

Appendix D: Environmental, Aboriginal Consultation and Project Location Questionnaire



#### **Environmental, Aboriginal Consultation and Project Location Questionnaire**

Please note that if you are completing this questionnaire due to a proposed project amendment for a project already submitted to Infrastructure Canada (INFC), please only include the amended project information.

#### **Project Name:**

Canadian Centre for Climate Change and Adaptation

#### **Project Proponent:**

University of Prince Edward Island

Contact person and their contact information for any question Infrastructure Canada could have regarding the environmental assessment and/or aboriginal consultation:

Name:

Dr. Alaa Abd-El-Aziź

Address: 550 University Avenue, Charlottetown, PE, C1A 4P3

Phone:

902-566-0400

Email:

abdelaziz@upei.ca

#### **Project Description:**

Please refer to Section 1 Project Description of the Project Business Case.

#### **Description of the existing environment:**

Please refer to Section 1 Project Description of the Project Business Case.

#### Part B: Environmental Assessment Questionnaire

<u>Instructions to respondent:</u> For **Parts B and C of the Environmental Assessment Questionnaire**, select only "Yes" if applicable to the proposed project. When "Yes" is not selected, "No" will be assumed.

	y part of your project involve the construction, operation, decommissioning or ment of the following infrastructure?
Yes 🗍	Electrical transmission lines
Yes 🗍	Electrical generating facility
Yes 📗	Structure for the diversion of water including dam, dyke or reservoir
Yes 🗌	Canal, lock or structure to control water level
Yes 🗍	Oil and gas pipeline
Yes 📗	Marine terminal
Yes 🗍	Railway line and / or Railway yard
Yes 🔲	All season public highway
Yes 🗌	Aerodrome, airport or all-season runway
Yes 🗌	Hazardous waste facility
Yes 🗌	Waste management facility
Yes 🗌	Industrial facility
Yes 🗌	Offshore exploratory wells
Yes 🗌	Off-shore floating or fixed platform, vessel or artificial island
Milesofth et autorities (NOTA) at Chief auto-	
Yes 💹	International or interprovincial bridge or tunnel
Yes U	Bridge over the St. Lawrence Seaway
Yes 🗌	
Yes Part B.2:	Are any part of the project or activities proposed to be located within:  A wildlife area
Yes Part B.2:	Bridge over the St. Lawrence Seaway  Are any part of the project or activities proposed to be located within:
Yes Part B.2:	Are any part of the project or activities proposed to be located within:  A wildlife area
Yes Part B.2: Yes Yes Part B.3:	Bridge over the St. Lawrence Seaway  Are any part of the project or activities proposed to be located within:  A wildlife area A migratory birds sanctuary  Is the project a designated project according to the Regulations Designating Physical
Yes Part B.2: Yes Yes Yes Part B.3:	Bridge over the St. Lawrence Seaway  Are any part of the project or activities proposed to be located within:  A wildlife area A migratory birds sanctuary  Is the project a designated project according to the Regulations Designating Physicals?
Yes Part B.2. Yes Yes Part B.3: Activitie	Bridge over the St. Lawrence Seaway  Are any part of the project or activities proposed to be located within:  A wildlife area  A migratory birds sanctuary  Is the project a designated project according to the Regulations Designating Physicals?  No  Unknown
Yes Part B.2. Yes Yes Part B.3. Activitie Yes I	Are any part of the project or activities proposed to be located within:  A wildlife area  A migratory birds sanctuary  Is the project a designated project according to the Regulations Designating Physicals?  No  Unknown  o the question above, have you provided the Canadian Environmental Assessment
Part B.2: Yes  Yes  Yes  Yes  Yes  Yes  Yes  Yes	Are any part of the project or activities proposed to be located within:  A wildlife area  A migratory birds sanctuary  Is the project a designated project according to the Regulations Designating Physicals?  No  Unknown  o the question above, have you provided the Canadian Environmental Assessment
Yes Part B.2. Yes Yes Part B.3. Activitie. Yes I	Bridge over the St. Lawrence Seaway  Are any part of the project or activities proposed to be located within:  A wildlife area A migratory birds sanctuary  Is the project a designated project according to the Regulations Designating Physicals?  No  Unknown

New Building Canada Fund – Provincial-Territorial Infrastructure Component (NRP)

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Part B.4: Federal Lands Would any part of the project or activities be located on:
Yes Federal land
Yes Indian Reserve land
Don't P. F. Warild any and of the majority and initial bull-model in
Part B.5: Would any part of the project or activities be located in:  Yes Internal waters of Canada, in any area of the sea not within a province
Yes The territorial sea of Canada, in any area of the sea not within a province
Yes The exclusive economic zone of Canada  Yes The continental shelf of Canada
If you answered "yes" to any of the above (B.4 and B.5), please provide the information regarding the federal land administrator and a description of federal lands (a map should be included if available).
N/A
Also indicate if the entire project footprint is located on federal lands. If not, please indicate the portion that will take place on federal lands.
N/A
Are important environmental issues expected as a result of this project? If "yes", please elaborate.
N/A
Are important public concerns expected as a result of this project? If "yes", please elaborate.
N/A
PTIC-NRP - Project Business Case Guide Page 3

	any part of the ed by previous		n whole or in part o	on land potentially	
Comments	(if any):				In Proceedings of the Standard Control of Co
					588 VOOLUUS-SATAN-GEEGEE-201-201-201-201-201-201-201-201-201-201
Part B.7: Is contaminat		al site assessme	nt available for this N/A	project regarding	
Yes	No	Phase II	N/A		
Yes	No Landon Santa Company (1975) Annual addition to the contract of the contract	Phase III	N/A returns and the relative of the second florest decreases a resource of the second control of the resonance and the second control of the second contro		in whereweap or a state growth and grow government of a contract of a state of a contract
not already	done. If the rep	oort(s) is/are at th	ne development sta	eport(s) that are relat ge, please, provide th d when it/they will be	e following
				ovincial environmen regime or other regi	
the report(s	s) is/are at the d		e, please, provide th	ited to the project if in the following informating in the following informating in the following in the fol	· ·
			1		

New Building Canada Fund – Provincial-Territorial Infrastructure Component (NRP)

Page 37

#### Part C: Aboriginal Consultation Questionnaire

Part C.1: Involvement of the Crown - Other Federal or Provincial Departments or Agencies who may have a duty to consult Aboriginal peoples due to their involvement in the project (e.g.: permit and/or authorization), such as, but not limited to:				
Yes 🗌	No X	Unknown 🗌	Fisheries and Oceans Canada (e.g. Fisheries Act)	
Yes 🗌	No X	Unknown 🗌	Transport Canada (e.g. Navigable Waters Protection Act)	
Yes 🗌	No X	Unknown 🗌	Environment Canada (e.g. Species at Risk Act, Migratory Birds Convention Act, Canadian Environmental Protection Act)	
Yes 🗌	No X	Unknown 🗌	Natural Resources Canada (e.g. Explosives Act)	
Yes 🗌	No X	Unknown 🗌	Canadian Environmental Assessment Agency	
Yes 🗌	No X	Unknown 🗌	Parks Canada Agency	
Yes 🗌	No X	Unknown 🗌	Health Canada	
Yes	No X	Unknown	Other departments (e.g. federal department, provincial department, funding department,)  If applicable, please identify the federal department or agency and approval required)	

If you answered "yes" to any of the above, please describe the involvement of the identified department(s)/agency(s) in detail.

Part C.2:	Achivities Rel	ated to the Project
Yes 🗌	No 🖺	Does the project involve works or activities on, under, over, through or across a water body such as a wetland, stream, river or lake?
Yes 🗌	No X	Are there any land use changes that may affect traditional activities such as, but not limited to, deforestation or clearing of vegetation?
Yes 🗌	No X	Is any component of the proposed project located outside the existing project footprint?
Yes 🗌	No X	Will ownership of land change as a result of the project?
Yes X	No 🗌	Is the project occurring on land that has yet to be developed / disturbed? <sup>5</sup>
Yes 🗌	No X	Are there any relevant project activities that might affect other aspects of the environment (e.g. sound and/or noise level increased, barrier limiting the access for harvesting, runoff in a watercourse excavating activity)?

 $<sup>^{5}</sup>$  If you answered yes, please, provide details regarding how much land will be affected by the project in the description below.

If you answered "yes" to any of the above, please provide a description or the activities described in part C.2.

The land is a field that has not been used for farming or personal use. We are building a Canadian Centre for Climate Change and Adaptation that will bring researchers from Atlantic Canada, Canada and Internationally to solve issues identified by our community.

Have you been in contact or do you plan to contact any Aboriginal groups regarding this project? If "yes", please provide some details regarding the nature of your communication and include in an attachment any information that may be useful (e.g. contact information, letters, emails, public notices, and any other types of communications).

Canadian indigenous communities' relationship to the environment is valuable for understanding climate vulnerability, impacts and adaptation. Discussions with Indigenous leaders will be taking place in the very near future.

Are any potential issues expected as a result of this project? If "yes", please elaborate.

No. Our Indigenous leaders have been a very strong part of our University. They have helped us to strenghten our programs. This will be another project we can collaborate on.

New Building Canada Fund – Provincial-Territorial Infrastructure Component (NRP)

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#### Part D: Project Location Questionnaire

In order to facilitate and accelerate the assessment of your request for funding, Infrastructure Canada needs to geographically locate your project accurately. The information provided will ensure the proper location of the project for future reference. You are therefore asked to complete this questionnaire to the best of your knowledge and with as much precision as possible.

Part D.1: Project Location SEE APPENDIX					
	Address of the project	Location 1	Location 2		
S	Civic Number:	· .			
res	Unit/Suite/Apt:				
B	Street Name:				
ဗ္ဗ	Municipality:				
fixe	County:				
£	Province:				
Project with fixed address	Postal Code:				
ect	Project Longitude:				
ō					
_	Project Latitude:				
	·				
ν <sub>2</sub>	Additional Project Location Details:				
res ts	Please indicate, for each project component, any points of interest, intersections, major				
en	highways or streets, or other physical chard	acteristics located in the vi	cinity of the project		
o o	(i.e. near airport, adjacent to Lions Gate Bri	idge, 3 km east from Cento	ennial Park, at		
i Ke	intersection of Fifth and Queen, etc.)				
Project with no fixed address or multiple components	Component A:				
함	Component B:				
u Ki	Component C:				
ect .	Component D:				
Q o					
Δ.					
Projec	t Location Documents:				
As a minimum, please include in an attachment (hard copy or electronic file) a project location					
map.	If available, please include any further projec	t location documents tha	t may be useful in		
locating the project, such as: a site plan, hand drawings on a printed map, print of maps from					

Google Maps/Google Earth/MapQuest/Yahoo Maps etc., location plan, aerial photo, legal or written description of project location, survey plan, engineering plan, or any other plans or

drawings from reports, studies or analysis.

#### Part E: Declaration of Information

Part E.1: Declaration of Information:			
I certify that the information provided is accurate to my knowledge and understand that inaccurate information may result in the requirement for additional environmental and/or aboriginal review.			
Questionnaire completed by: Dr Alaa Abd-El-Aziz			
Signature			
Date: May 24, 2018			

Appendix E: Estimated Capital Costs and Proposed Capital Financing
Plan



ATIA - 20(1)(b) ATIA - 20(1)(c) ATIA - 20(1)(d)

## Canadian Centre for Climate Change and Adaptation Estimated Capital Costs and Proposed Capital Financing Plan May 2019

#### **Estimated Capital Costs**

Ineligible Costs: Land and site improvements\*

Eligible Costs: Building Construction (see attached)

**TOTAL** 

#### **Proposed Capital Financing for Eligible Costs**

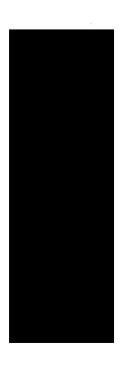
Infrastructure Canada

Province of Prince Edward Island

University of Prince Edward Island

**TOTAL** 





# Page(s) 279 to 280 are withheld pursuant to paragraph 13(1)(c) of the Access to Information Act

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Appendix F: Projected Financial Statements



# Page(s) 282 to 300 are withheld pursuant to paragraph 20(1)(b), 20(1)(c), & 20(1)(d) of the Access to Information Act

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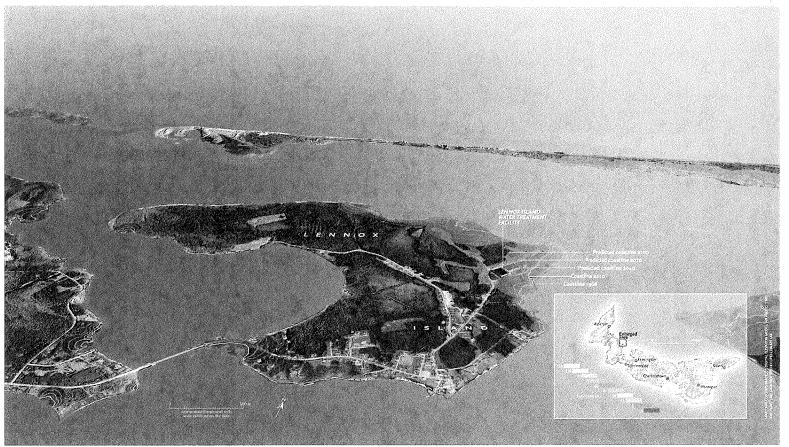
La/les page(s) 282 à 300
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Appendix G: Canadian Centre for Climate Change and Adaptation Business Plan (original, dated September 2017)



## CANADIAN CENTRE FOR CLIMATE CHANGE AND ADAPTATION

#### CONFIDENTIAL



UPEI Climate Lab Sea Rise Visualization as featured in Canadian Geographic (May and June 2016 editions)

#### **BUSINESS PLAN**

September 2017



#### **FOREWORD**

The Canadian Centre for Climate Change and Adaptation hosted by the University of Prince Edward Island (UPEI) will work collaboratively to build capacity for evidence-based decision making needed to inform policy, advance research, and accelerate innovation to enable Canada's effective transition to a clean growth economy.

The Canadian Centre for Climate Change and Adaptation is built on a model of strong research and higher learning, hallmarked by purposeful collaboration with communities, industry, and governments.

Within the Centre, UPEI will lead four research centres of excellence in:

- Data and Policy Analysis for Transition to Low-Carbon Economies,
- Coastal Systems Impacts,
- Clean Technology Innovation in Support of Agriculture and Aquaculture, and
- Climate Change and Human Health.

Together, the research centres will form a cluster of discovery and new knowledge acquisition within the Canadian Centre for Climate Change and Adaptation. By leveraging existing strengths of the UPEI Climate Research Lab (a globally recognized climate research centre that has drawn the praise of research intensive institutions such as MIT and Stanford University), the climate change and adaptation knowledge cluster will be further developed through strong networks and timely partnerships to ensure the application of new knowledge and innovation within our communities.

Within the Canadian Centre for Climate Change and Adaptation, UPEI will deliver higher learning programs focused on developing much needed climate change professionals, researchers, and decision makers of the future, through UPEI's recently approved Bachelor of Science in Applied Climate Change and Adaptation, as well as a Master in Climate Change and Adaptation that is in development.

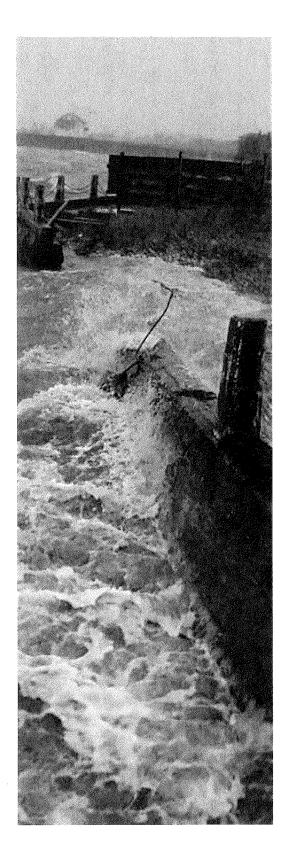
The Canadian Centre for Climate Change and Adaptation's commitment to scientific discovery, application, and new climate change knowledge will provide Canada with the capacity to deliver climate change solutions needed to advance Canada's clean growth economy for the prosperity and well being of all our citizens.

Alaa S. Abd-El-Aziz, B.Sc., M.Sc., Ph.D., FCIC President and Vice-Chancellor, University of Prince Edward Island

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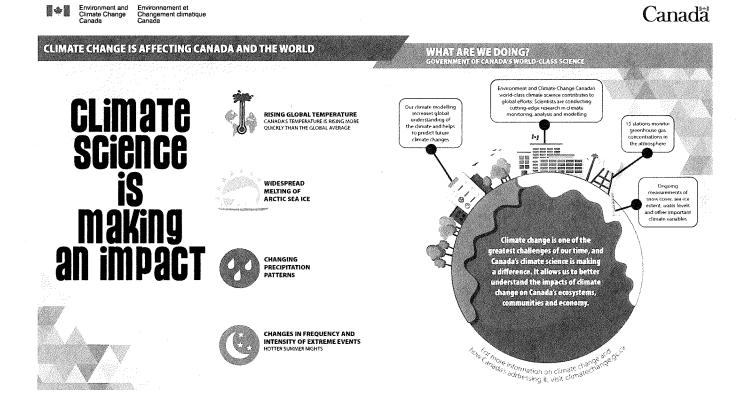
#### **EXECUTIVE SUMMARY**

Building on existing and emerging expertise, UPEI is taking a national leadership role in building knowledge capacity and accelerating innovation in the area of climate change and adaptation – one of the greatest challenges of our time.

To achieve this, UPEI is proposing to establish the Canadian Centre for Climate Change and Adaptation, including four Research Centres of Excellence, to support the creation of new climate change knowledge, adaptation, and innovation needed to accelerate Canada's transition to a clean growth economy that is necessary to promote the long-term productivity and health of our Canadian communities.

The new UPEI Research Centres of Excellence will be housed within the proposed Canadian Centre for Climate Change and Adaptation at a UPEI satellite campus to be located in St. Peter's, PEI. This location provides an advantage to researchers, students, and partners with its close proximity to protected land and unique ecosystems within Parks Canada's National Park at Greenwich. The Centre's location in Eastern PEI supports the University's strategy to develop transformative and immersive climate change programs 'in the field' with strong collaboration and community outreach.

Research conducted through the new Research Centres of Excellence will build new knowledge and capacity to address climate related risk assessment, develop mitigation and adaptation strategies, and support clean technology development. Knowledge and solutions will be applied and adapted to communities locally, nationally, and globally.



3 | Page

### 1.0 A FORTIFIED APPROACH TO BUILDING CAPACITY IN CLIMATE CHANGE AND ADAPTATION

#### VISION AND STRATEGIC PRIORITIES

The Canadian Centre for Climate Change and Adaptation will be a leader in climate change adaptation and resilience by building capacity for evidence-based decisions that are needed to inform policy, advance research, and accelerate innovation for the prosperity and well-being of all citizens.

The strategic priorities of the Canadian Centre for Climate Change and Adaptation include:

- to provide government and industry with next generation professionals and researchers who have the skills and experiences that are required to help communities remain sustainable in the face of climate change (from the perspectives of economic, well-being/health, and culture);
- to deliver truly unique experiential learning and discovery opportunities for students, faculty, and visiting researchers who will have a direct impact on community, industry, and public policy; and
- to work with businesses, industry, communities, and government to determine the solutions to climate change challenges that will inform public policy in a manner that supports sustainable communities, adaptable sectors, and entrepreneurial developments, enabling transition to a clean growth economy.

The Research Centres of Excellence within the Canadian Centre for Climate Change and Adaptation will build capacity in four core areas:

Data and Policy Analysis for Transition to Low-Carbon Economies

**Coastal Systems Impacts** 

Clean Technology Innovation in Support of Agriculture and Aquaculture

Climate Change and Human Health

The Research Centres of Excellence will leverage UPEI's **proven track record** in mobilizing new knowledge in climate change, working with local, national, and international communities, as well as **interdisciplinary research** through collaboration with existing and complementary expertise at UPEI, and climate change networks around the world.

#### PROPOSED DIRECTION

UPEI is proposing to establish the Canadian Centre for Climate Change and Adaptation, including four Research Centres of Excellence to support the creation of new climate change knowledge, adaptation, and innovation needed to accelerate Canada's transition to a clean growth economy. This transition will enable the promotion of the productivity and health of Canadian communities over the long-term.

The proposed Canadian Centre for Climate Change and Adaptation will mobilize new knowledge and expertise that is applied locally and adapted at national and global levels. The enhanced direction and focus on climate change for UPEI, as outlined in this document, exemplifies the four pillars of the University that build on core strengths: Student Experience, Vibrant Communities, Exploration and Discovery, and Longterm Sustainability.

The Centres of Research Excellence in Climate Change and Adaptation will be housed within the Canadian Centre for Climate Change and Adaptation hosted by UPEI and located in St. Peter's, PEI. Researchers, students, and partners will have ready access to the internationally-recognized UPEI Climate Research Lab, as well as access to outstanding global climate partner networks, and researchers in diverse areas of climate and climate-related areas of expertise being developed through new higher learning and research programs. The Centre's location provides an advantage to researchers and students with its close proximity to protected land and unique ecosystems within Parks Canada's National Park at Greenwich. Its location in Eastern PEI further supports the University's strategy to develop transformative and immersive climate change programs 'in the field' with strong collaboration and community outreach.

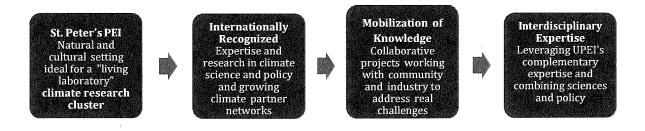




Photo: UPEI Climate Research Lab

#### **ALIGNMENT WITH UPEL PRIORITIES**

UPEI has a proud history, successful alumni, a strong relationship with community, and engaged and talented faculty, staff, and students. Working collaboratively and building on its many strengths, UPEI is committed to success through transformation.

UPEI has an impressive track record of educating leaders and attracting internationally-renowned experts who are discovering new knowledge and applications needed for the health and prosperity of communities at home and around the world. By focusing on potential through a shared sense of purpose and values, UPEI continues to pursue educational excellence and position the University as an academic and research leader, and as a destination for those driven by discovery.

UPEI strategically strives to achieve its vision to deliver outstanding experiential learning opportunities that encourage students to develop to their full potential in both the classroom and the community; to be a destination for those eager to advance the world by creating new knowledge; and to foster the development of tomorrow's leaders who will emerge from their studies ready to excel and contribute to the betterment of our global and local communities.

The proposed Canadian Centre for Climate Change and Adaptation and Research Centres of Excellence are well-positioned to prosper through UPEI's commitment to achieve its vision.

UPEI proudly offers world-class resources, access to global leaders, and outstanding partner networks within a small, comprehensive university setting. This enables the University and the province to demonstrate the benefits of being nimble, innovative, strongly connected, and globally competitive.

UPEI is the only small university in Canada that is home to:

- · a Canada Excellence Research Chair,
- a Lévesque Research Chair,
- the only UNESCO Chair east of Quebec,
- a Centre of Excellence for Commercialization and Research (CERC),
- the UPEI Climate Research Lab and MIT-award winning technology for visualizing coastal erosion and sea-level rise, and
- Canada First Research Excellence funding.

UPEI has achieved exponential growth in research and was ranked first in Canada for attracting research dollars by MacLean's Magazine in 2016. UPEI ranked 2<sup>nd</sup> for research intensity and 4<sup>th</sup> for international research collaboration among 22 primarily undergraduate Canadian universities by Research Infosource Inc.

#### A TIME FOR ACTION

The Government of Canada, as well as global leaders such as the United Nations and G20, have identified climate change as one of the greatest challenges of our time. With wide-spread recognition and growing concerns about climate change, an urgent need exists to advance education, research, and knowledge transfer to future climate leaders and decision makers.

The *Paris Agreement* brings all nations into a common cause to undertake ambitious efforts to combat climate change and adapt to its affects. Canada's participation in the international climate conference in Paris signals a determined new approach to domestic and international collaboration to achieve a climate change agreement.

The Prime Minister of Canada has communicated the need for Canada to do more to address the global challenge of climate change indicating that "...our government is making climate change a top priority [which is] necessary for our collective health, security, and prosperity..."

Advances in climate science will enable a clean growth economy that supports the creation of new jobs, an improved quality of life, and innovations that are capable of supporting the long-term sustainability of our environment, health, and economic sectors...

In pursuing climate change advances, the Government of Canada has set clear principles to:

- act based on best scientific evidence and advice;
- develop and implement policies that contribute to a low-carbon economy; and
- take leadership roles on climate change including community mobilization, innovation, and sharing knowledge with developing countries.

A **clean growth economy** is at the forefront of Government of Canada priorities, recognizing that protecting the environment and growing the economy go hand-in-hand. Canada needs to be better positioned to take advantage of opportunities in the new global economy through a diversified economy that creates new innovation and opportunity, while supporting the sustainability of communities and key economic sectors.

The Government of Canada has committed to continued investments in education, research and development that will strengthen Canada's clean energy and technology sectors (Government of Canada, Canada's Vision for a Clean Growth Future, www.canada.ca/en/services/environment/weather/climatechange/vision-clean-growth.html).

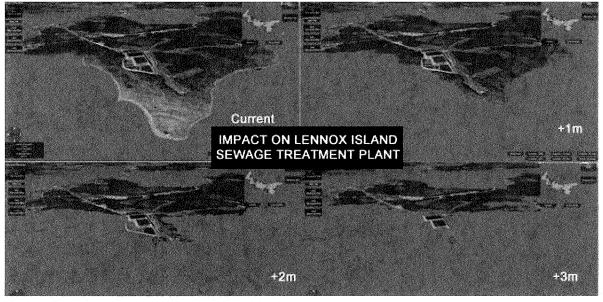
"Clean growth and climate change" is one of five action areas identified in the *Atlantic Growth Strategy*, a strategy identifying cooperative actions among the Government of Canada and four Atlantic Provinces. A focus on climate change is important in Atlantic Canada to stimulate economic growth, create clean jobs, and drive innovation in the transition to a low-carbon economy.

According to Canada Climate Action Network and other organizations, Atlantic Canada is recognized as **one of Canada's regions most threatened by global climate change**. As warming in global temperatures will result in an increase in storm events, intensity, rising sea levels, storm surges, coastal erosion and flooding, Atlantic Canadian's coastal communities will become increasingly vulnerable, with vital infrastructure and industries that are key economic drivers for the Atlantic region (such as agriculture, aquaculture, fisheries, and tourism) being adversely impacted (<a href="http://climateactionnetwork.ca/issues/impacts-and-adaptation/learning-cente/impacts-incanada/">http://climateactionnetwork.ca/issues/impacts-and-adaptation/learning-cente/impacts-incanada/</a>). As a result, these economic sectors and overall prosperity are at risk due to climate change impacts.

The Province of Prince Edward Island strongly echoes its support for the Government of Canada's action plan on climate change and the need for knowledge transfer that supports a clean technology economy. The Province's most recent plan, A Mighty Island: A Frameworkfor Economic Growth, outlines PEI's priority to integrate adaptation strategies into economic sectors while growing R&D related innovation and start-ups.

The importance of climate change action and the development of a clean growth economy by federal and provincial governments is a good indication of the trajectory for growth in demand for individuals with expertise in climate change and adaptation that are capable of spearheading change and working collaboratively towards solutions. The ability to respond to such demand for expertise can only be fostered through higher learning.

UPEI stands poised to accelerate and enhance its existing focus on climate change and adaptation research in a manner that will advance Canada's climate change agenda. This will be accomplished through the proposed Canadian Centre for Climate Change and Adaptation and four research centres of excellence.



**UPEI Climate Research Lab** 

ATIA - 13(1)(c)

ATIA - 20(1)(b) ATIA - 20(1)(c) ATIA - 20(1)(d)

Canadian Centre for Climate Change and Adaptation: Business Plan

#### **FINANCIAL IMPLICATIONS**

Detailed project costs and financing implications are provided in section 5 of this document. As an overview, the construction budget estimate based on a preliminary concept-level design is per square foot, exclusive of specialized technology and equipment. On this basis, capital costs for the construction of the building are estimated to be

#### **Estimated Total Project Costs**

	Year One to Three
Land, land improvements and site construction	
Building	
Specialized equipment and leading-edge technology	
Computer equipment	1-
Furniture and fixtures	
Total capital costs	
Start up and industry collaboration launch	
TOTAL PROJECT COSTS	

Access to specialized equipment and leading-edge technology is vital to administering educational programming and advancing research in the area of climate change and adaptation. Through extensive consultation with faculty and industry experts, UPEI has identified the technologies and equipment required for the Canadian Centre for Climate Change and Adaptation and Research Centres of Excellence. Specialized equipment and leading-edge technology are estimated to be

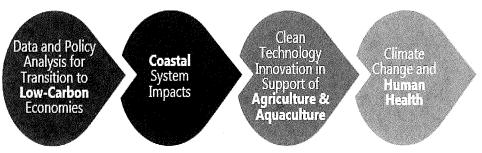
For the purpose of budgetary and planning purposes, the proposed financing structure is as follows:

#### **Proposed Project Financing**

a de la companya de l	Year One to Three
Fundraising and donations	
Non-repayable government start up contributions	
Non-repayable government capital contributions	
Total Proposed Project Financing	

An investment in the establishment of the Canadian Centre for Climate Change and Adaptation and Research Centres of Excellence is an investment in the collective health, security, and prosperity of Canadians. UPEI is ready and able to play a significant role working with leading climate experts, government, non-government, community and industry partners to advance research, knowledge, and mobilization of climate change and adaptation to address one of the greatest challenges of our time.

## 2.0 RESEARCH CENTRES OF EXCELLENCE WITHIN THE CANADIAN CENTRE FOR CLIMATE CHANGE AND ADAPTATION



- Experiential learning & discovery
- Research & knowledge transfer = public policy
- · Community engagement & sustainability
- Innovative industry partnerships
- Clean growth technology & developments
- Provincial, Atlantic Canadian, & national priorities

The four synergistic Research Centres of Excellence define UPEI's agenda to advance knowledge, products, and services to better inform decision makers about climate change related risks and optimal adaptation approaches. Through an integrated approach to climate change and adaptation research, the centres will be a destination for world-class research and learning, providing expertise and collaboration within a living laboratory setting hallmarked by access to high quality datasets, multidisciplinary research teams, outstanding graduate and postdoctoral fellows, and engaged industry, community, and government partners.

These elements create an interactive environment that will foster new knowledge and R&D for climate change innovation and adaptive solutions. By the nature of their focus to use predictive analysis to determine future scenarios, a priority exists within the Centres to train high quality personnel and climate scientists for anticipated jobs and research needs resulting from climate impacts.

Individually and together, the four Centres aim to:

- work at the speed of business to advance climate change science and solutions that support entrepreneurs, industry, government, and communities to enable decision making that ensures long-term social, economic, and environmental sustainability
- ✓ improve assessment of climate change-related risks and impacts
- ✓ build capacity to support evidence-based decision making to benefit Canada's prosperity on all levels
- ✓ improve observation, monitoring, and surveillance networks to build unique climate-related datasets and expand opportunities for new research
- ✓ contribute to Canada's green economy through development of clean technology
- develop as a world-class model for a highly successful integrated living lab that is known for highly collaborative learning, research, and community outreach

Unique to Canada, the Canadian Centre for Climate Change and Adaptation will provide a hub for collaborative climate change learning, research, and innovation in a living laboratory setting.

Knowledge capacity and transfer from research initiatives and universities to industry is vital to enhancing competitiveness in all sectors of the economy. Industry's thirst for new knowledge has resulted in a greater need for partnership and collaboration between universities and companies, not only in Atlantic Canada, but across the globe. These partnerships require much more than a simple exchange of knowledge for funding. The strategic partnerships must share similar core values and have a vested interest in realizing synergies for the mutual benefit of all parties.

UPEI has set an impressive precedent for industry-university partnerships with the establishment of the UPEI School of Sustainable Design Engineering. Despite the young age of the Sustainable Design Engineering School, we are already seeing the benefits of these partnerships, including the ability for students and researchers to work with local companies to solve real problems. At the same time, companies are using the partnerships to innovate and advance their industry competitiveness.

UPEI will look to build on the momentum of its School of Sustainable Design Engineering, along with the outstanding efforts of the globally-recognized UPEI Climate Research Lab, to take a similar industry-university partnership approach to academics and research at the new Canadian Centre for Climate Change and Adaptation, with an Innovation Collaboration Space (ICS) as part of its key infrastructure and programming. The Innovation Collaboration Space will be an outstanding resource for organizations from a variety of industry sources to conduct business and research in full cooperation with researchers, as well as students and faculty.

This unique approach leverages UPEI applied climate change programming, networks, and research to create a self sufficient Innovation Collaboration Space that aims to operate solely on the financial investment of private companies, industry associations and tuition.

The Canadian Centre for Climate Change and Adaptation and the Research Centres of Excellence will be industry focused to help the PEI and Atlantic region's economy to react and adapt to the impacts of climate change. By establishing an atmosphere where academics and industry converge, the sharing of knowledge and technology from both sectors will make UPEI and the region a leader in academic and industrial research as it pertains to climate change and adaptation.

The Canadian Centre for Climate Change and Adaptation and the four Research Centres of Excellence will benefit local, regional, and international industries, including the agriculture and aquaculture sectors, and technology companies working to develop products that will further advance the study of climate change and adaptation (such as drone technology manufacturers).

# THE CANADIAN CENTRE FOR CLIMATE CHANGE AND ADAPTATION CENTRES OF RESEARCH EXCELLENCE

Centre for

Data and Policy Analysis for Transition to Low-Carbon Economies

Centre for Coastal Systems Impacts

Cartialin

Clean Technology Innovation in Support of Agriculture and Aquaculture

Centrelor

Climate Change and Human Health

Assessment, madeling forecasting

Risk management militgation adaptation

Scalable accessible adoptable dimens solutions

Support for informed well-aligned policy decisions

Development and proof of concept testing for clean technologies

New knowledge to benefit industry and community climate change-adaptation efforts

Evidence-based decision making for long-term economic, industry, and environmental systamability

### SUPPORTED BY HIGH QUALITY HIGHER LEARNING PROGRAMMING

Bachelor of Science (Applied Climate Change and Adaptation)
Bachelor of Science (Sustainable Design Engineering)
Master of Science (Sustainable Design Engineering)
Master of Science (Climate Change and Adaptation)\*
Master of Applied Health Services Research
PhD (Environmental Sciences)
PhD (Sustainable Design Engineering)\*

\*In development

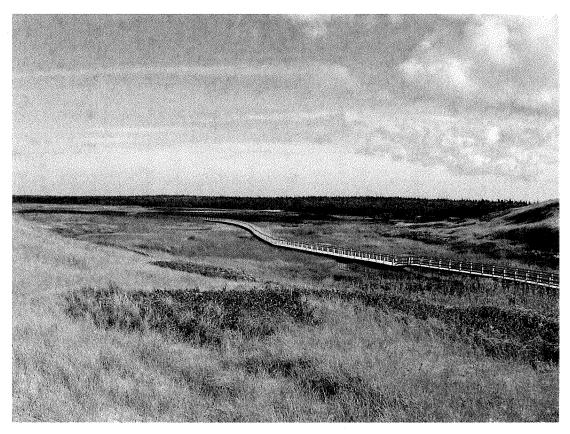
## A DESTINATION FOR COLLABORATIVE SUCCESS

The site of the proposed Canadian Centre for Climate Change and Adaptation has been purposely chosen to ensure proximity to ecosystems and coastal systems relevant to climate research, science, and monitoring programs.

Of particular benefit is the close access to protected areas within Parks Canada's National Park at Greenwich, PEI. Greenwich is home to an extensive and fragile coastal dune system, wetlands and various natural habitats in which numerous rare plant species are found.

One of the most spectacular natural characteristics at Greenwich is the unusually large and mobile parabolic dunes with their associated counter ridges. This phenomenon is very rare in North America. Greenwich is also noted for its cultural and historic assets, such as the archaeological digs conducted between 1983 and 2002 that have found traces left by early Aboriginal peoples, the Mi'kmaq, French and Acadian settlers, and Scottish, Irish, and English immigrants.

UPEI has a strong established partnership with Parks Canada at Greenwich. UPEI students and researchers have already worked to establish a truly unique 'living laboratory' environment in which numerous UPEI and Parks Canada research and monitoring projects related to wildlife, sustainable design engineering, climate change, and biology are underway.



Prince Edward Island National Park at Greenwich



# DATA AND POLICY ANALYSIS FOR TRANSITION TO LOW-CARBON ECONOMIES

The Canadian Climate Change and Adaptation Centre of Excellence for Data and Policy Analysis for Transition to Low-Carbon Economies will focus on expert analysis of data and policies, as well as collaborative research, to better understand how Canada can achieve the required transition to a low-carbon economy in a sustainable and economically viable manner.

The transition to a low-carbon emission energy system in Canada is now underway. But further cost reductions for low-carbon energy systems are expected and ultimately, the emergence of novel technological solutions.

### **EXPERTISE**

Climate change impacts all economic sectors and overall quality of life. "In Canada alone, it has been estimated that, in the absence of action to address global warming, [the country] will face annual costs of between \$21 billion and \$43 billion by the 2050s." (Timothy Lane, Deputy Governor of the Bank of Canada, Finance and Sustainability Initiative, 2 March 2017)

Changes made in response to—or in anticipation of—climate change required responsible, evidence-based decision making. Just as climate change and its impacts are complex, the processes of collecting, analyzing, and interpreting data capable of identifying climate change priorities and guiding cost-effective decisions for the long-term, are also complicated.

Through this Centre, the Canadian Centre for Climate Change and Adaptation will provide multidisciplinary expertise in areas such as Economics, Data Analytics, Actuarial Sciences, Climate Change, Political Science, Sustainable Design Engineering, and Environmental Studies. Centre experts will analyze data and the effectiveness of economic and government policies needed to guide Canada's transition to a low-carbon economy. In addition, the Centre's researchers will provide government, industry, and communities with demonstrations of renewable energy projects at differing scales, and conduct field projects to study effectiveness of new economic policies.

The Centre for Data and Policy Analysis for Transition to Low-Carbon Economies is a collaborative centre of research and knowledge transfer. The Centre aims to continuously develop and make accessible to others, highly-relevant data collections on climate change that do not exist elsewhere. Through multidisciplinary expertise and collaborations, these collections will enable unprecedented capabilities for data analytics and modeling needed to identify, forecast, and mitigate risks associated with transition to low-carbon economies.

In addition to high-calibre undergraduate and graduate students, post-doctoral fellows, and researchers from UPEI, the Centre will encourage participation by multi-institutional and government research partners, visiting scholars, and experts to foster new knowledge that leads to applied research opportunities and, ultimately, benefits to communities. Industry partners will play an exciting role in building data sets for economic sectors.

Through research partnerships, niche research seminars, and workshops, the Centre aims to be a global destination for those eager to collaborate on new ideas, data collection, and use of valuable data to build capacity needed to make evidence-based decisions that better inform economic and environmentally sustainable goals within low-carbon economics.

## SCOPE OF RESEARCH AND COLLABORATIVE INTERESTS

The scope of research and collaborative interests within the Centre include, but are not limited to:

- ✓ economic assessment of climate change policies;
- development of effective evidence-based policies for responsible long-term social, economic, and environmental sustainability;
- ✓ development of risk management frameworks via predictive analytics, risk assessment, and risk
  modeling to enable best-possible decisions, including:
  - analysis of big data for incremental and holistic economic implications of low-carbon economic shifts;
  - analysis of data to identify climate change and economic priorities; and
  - analysis of data to identify optimization (to enable larger communities, businesses, and households to cost effectively transition to smaller carbon-footprint).

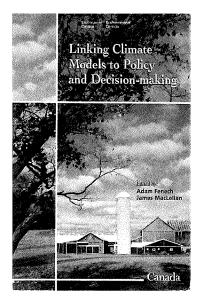
The Centre's scope will make it a destination for global experts eager to participate in research collaborations and workshops for data analytics in relation to economic implications of climate change. This includes providing visiting researchers with access to data collections, infrastructure, and high-quality learning opportunities.

In addition, the Centre will be an unprecedented resource for a wide range of industry partners (including, but not limited to, insurance sector, municipalities, energy sector, tourism sector, and other industries requiring evolved labour market preparedness) to ensure these partners are capable of including climate risk assessments into decision-making processes to support responsible planning and sustained prosperity.

As an advocate for community-engaged scholarships, the Centre will work towards timely knowledge transfer to benefit the economic health and well-being of communities.

Through the development of innovative programs, UPEI aims to establish the knowledge and physical infrastructure required to build Centres of Research Excellence that encourage global interactions and world-class science in support of climate change and adaptation.

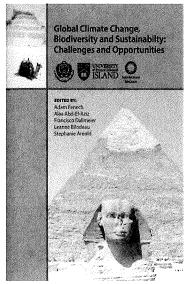
The creation of four centres of climate research excellence in St. Peter's, PEI, is a natural extension of UPEI's strong climate networks that range from Atlantic Canada to Central America and China, providing world-class opportunities to demonstrate the ability of rural areas to define themselves as sustainable global centres of knowledge as thriving living labs.



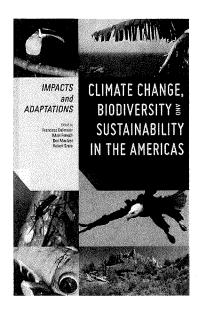
**Integrated Mapping** 

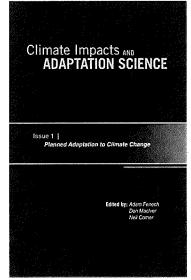
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**Assessment** 











## DATA AND POLICY ANALYSIS FOR TRANSITION TO LOW-CARBON ECONOMIES

RATIONALE: NEW POLICIES AND EMERGENCE OF NOVEL TECHNOLOGIES

Countries around the world have made commitments under the 2015 Paris Agreement to reduce greenhouse gas (GHG) emissions in an effort to avoid potentially dangerous levels of climate change. Scientists have defined 'dangerous levels' when global average temperature increases remain "well below 2°C above pre-industrial levels and the need to pursue efforts to limit temperature increase to 1.5°C".

The transition to a low-carbon emission energy system in Canada is now underway. Coal is being phased out from electricity generation and mechanisms for pricing the carbon content of GHG emissions will be in place across the country by 2018. There remain many challenges and opportunities in achieving a low-carbon energy transition that will create jobs and build more sustainable, livable, and equitable communities.

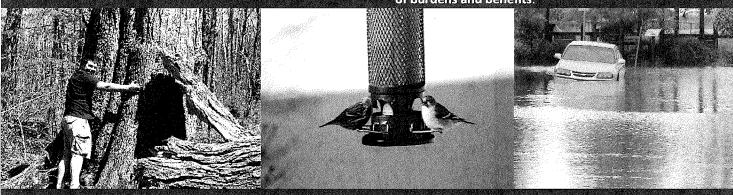
Today, the bulk of Canada's energy needs are being met by fossil fuels. Yet the GHGs released by fossil fuel combustion are driving climate change. Existing international agreements suggest an 80% reduction of GHG emissions will be required by mid-century in industrialized countries. Due to the difficulty of reducing emissions in agriculture, specific industrial processes, and other sectors, this implies the virtual elimination of GHG-emitting sources

from the energy mix over the next 30 to 40 years. Such a transformation of the way humans produce and consume energy will not be easy.

Other ways to produce energy include hydro, nuclear and other established alternatives, as well as newer renewables such as wind, solar, biomass, and geothermal. Technological innovation is ongoing and over coming decades, further cost reductions for low-carbon energy systems and the emergence of novel technological solutions are expected.

Economic analyses suggest the aggregate costs of a transition to low-carbon energy systems will not be ruinous. The obstacles to movement are not primarily technical or economic, but rather related to social and political factors — locally, regionally, nationally, and internationally. Established ways of doing things are deeply entrenched.

In Canada, tens of thousands of jobs, the viability of many business ventures and the tax revenues of governments are tied up with the fossil fuel industry. Of course, low-carbon energy also offers tremendous economic opportunities. A judicious policy approach will be required to shift local, regional, national, and international cultures and economies and in a manner that will ensure a fair distribution of burdens and benefits.





## COASTAL SYSTEMS IMPACTS

The proposed Coastal Systems Impact Research Centre of Excellence will focus on expanding UPEI's existing expertise in climate change vulnerability, impacts, and adaptation, while developing new strengths in ocean acidification research. The Centre will provide knowledge needed to clearly define priorities associated with coastal impacts and ocean acidification, providing decision makers with information and tools to optimize adaptation strategies.

Coastal erosion is expected to continue and likely become more severe, threatening public and private infrastructure at great economic cost. Greater knowledge of coastal impacts, and appropriate mitigation and adaptation strategies are needed to support Prince Edward Island and other coastal areas across Canada and around the world.

## **EXPERTISE**

## EXISTING EXPERTISE: COASTAL SYSTEMS IMPACTS

Coastal erosion and coastal infrastructure impacts due to storm surges, wave forcing, and sea-level rise are perhaps the greatest climate-related challenges for Prince Edward Island. However, these impacts are not isolated to PEI. The immediate need to better analyze, model, and forecast coastal systems impacts is a challenge shared on a global level.

Due to anticipated ocean, geological, and storm population, coastal erosion is expected to continue and likely intensify, threatening public and private infrastructure at significant economic and cultural costs. PEI's precarious sensitivity to erosion is a troubling reality for the province's population. This sensitivity, combined with the unique expertise of the Centre for Coastal Systems Impacts, makes PEI a model system for assessing and developing adaptation approaches for coastlines around the world.

The expertise of the Centre focuses on collaborative research and community outreach, as well as the development of innovative tools to advance the science of coastal system visualization, assessment, modelling, and forecasting. The UPEI Climate Research Lab's MIT-award-winning-tool (Coastal Impacts Visualization Environment [CLIVE]) for visualizing coastal erosion and sea-level rise has achieved global attention, including the interest of 40 Stanford University researchers who will visit UPEI in September 2017. This innovation will be further developed through the Centre to include realistic infrastructure.

Through collaboration with UPEI partners—including the UPEI Climate Research Lab, UPEI Canada Excellence Research Chair, UPEI Biology, the UPEI School of Sustainable Design Engineering, and the UPEI School of Mathematical and Computational Sciences—and various external partners, the Centre for Coastal Systems Impacts aims to customize applied research into potential commercialized changes, products, services, and innovation tools. The development of advanced drone technology for visualization of coastal vulnerabilities is a key example. Another example is advancing technology that will enable a new level of accurate and affordable measurement of localized wave action across entire coastlines.

As wave strength is a major determinant of coastal erosion, Centre activities will provide enhanced accuracy for coastal erosion forecasts for adaptation decisions, including assessing proposed coastal erosion protection systems.

# EMERGING EXPERTISE: OCEAN ACIDIFICATION

Increased carbon emissions and their absorption by ocean waters have triggered a gradual but unprecedented acidification of oceanic and coastal waters (Wootton et al., 2008). A significant gap in scientific knowledge currently exists in relation to ocean acidification in waters surrounding PEI.

The Centre for Coastal Systems Impacts aims to develop a research focus on acidification and the lowering of water pH in PEI waters. This will enable the Centre to understand the resulting impacts that directly threaten creatures and habitats dependent on calcium carbonate to build their shells, carapaces, or skeletons—in essence the chain from micro-algae to familiar species such as oysters, mussels, urchins, crabs, and lobsters.

It is recognized that negative effects of ocean acidification on species and the integrity of natural habitats will irremediably pass onto services and resources (Cooley et al., 2009). In an effort to identify and mitigate risks, the Centre will promote research collaborations to predict impacts to industries (such as commercial fisheries, aquaculture, and tourism) as well as broader anticipated impacts to food security, shoreline prosperity and community well-being of PEI, Atlantic Canada, and coastal regions around the world.

The Canadian Climate Forum, in its 2017 spring issue, highlighted the synergy between ocean acidification and sea-level rising, suggesting that PEI is likely the most vulnerable province in eastern Canada. Given its size, location, and close ties to coastal resources, Prince Edward Island is arguable one of the most ideal locations for the study of ocean acidification and its synergy with other components of climate change.

# SCOPE OF RESEARCH AND COLLABORATIVE INTERESTS

- Creation of dynamic models and development of protocols that are readily available for rapid assessment and forecasting in Atlantic Canada and other regions to support effective decision making, adaptive strategies, and policy development.
- ✓ Identification of key species and life stages impacted by ocean acidification for monitoring and forecasting in the Atlantic region to inform industry and government.
- ✓ Assessment of the influence on coastal systems impacts and ocean acidification on resources and industries and development of time scales (e.g., anticipated impacts in 2030, 2050, etc.) relevant to industry and government.
- Partnering with First Nations groups to examine vulnerable ancestral lands and adaptation measures to protect culturally significant areas.
- Promotion of collaborative research to advance new knowledge in synergistic areas of climate change and ocean acidification.

- ✓ Development and/or testing of commercialized products and services with local and global applications (including, but not limited to development of novel drone technology for coastal visualization, distributed wave sensing, precision instrumentation, wave tank testing, and full-scale monitoring to test coastal protection options).
- ✓ Partner with industry and government to prioritize adaptation measures through collaboration and timely knowledge transfer.
- ✓ Support timely advances in health, safety, and emergency measures through community engagement and partnerships.

The Centre's scope will make it a destination for global experts eager to participate in research collaborations and workshops in relation to coastal systems impacts and ocean acidification. This includes providing visiting researchers with access to high-quality datasets, research infrastructure, innovative technology, commercialized product development and testing, and high-quality learning opportunities. In addition, the Centre will be an unprecedented resource for a wide range of government, industry, and community partners who need to include climate risk assessments in their decision-making processes in order to support responsible planning and sustained prosperity.

As an advocate for community-engaged scholarship, the Centre will work towards timely knowledge transfer of benefit to the economic health, cultural sustainability, and well-being of communities.

# Indigenous Canadians face a crisis as climate change eats away island home

Rising sea levels mean that Lennox Island has lost more than 400 acres in just a few generations. Now its First Nations community wonders if it has a future.



The Guardian.com/world (UK)

Ashifa Kassam on Lennox Island Wednesday 18 January 2017 09.00 GMT

An aerial view of Lennox Island, off the coast of Prince Edward Island in eastern Canada. 'We're losing our island,' said one resident. (Photograph: The Government of Prince Edward Island)

## THE GLOBE AND MAIL

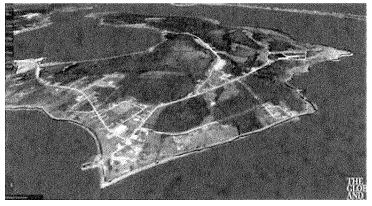
JANE TABER, FEBRUARY 19, 2014

# Erosion swallowing up PEI at rate of 28 centimetres a year

"Prince Edward Island is shrinking. The sea is swallowing up its ruby-red sandstone cliffs and coveted sandy beaches at a rate of 28 centimetres a year, and an estimated \$150-million in real estate is in danger of disappearing over the next 90 years, along with several of the island's prized golf courses and a wind turbine...

CLIVE – Coastal Impact Visualization Environment – is the product of a pan-Canadian collaboration which uses the guts of a 3-D game engine and controllers to allow the user to fly over a 3-D map of the island and raise and lower the level of the sea along the 1,260-kilometre coastline. So realistic is it that, at a recent public presentation, it drew gasps from islanders who saw their homes and cottages vanish..."

Full article available at https://beta.theglobeandmail.com/news/national/smallest-province-getting-smaller/article16988070/?ref=http://www.theglobeandmail.com&



UPEI Climate Research Lab Coastal Erosion Visualization Tool



CBC July 26, 2016 (Photo credit: Province of PEI)

## **COASTAL SYSTEMS IMPACTS**

RATIONALE: GREATER KNOWLEDGE IN COASTAL IMPACTS, MITIGATION AND ADAPTATION

National Resources Canada's 2016 Canada's Marine Coasts in a Changing Climate was developed based on collaboration among government, industry, and professional organizations to identify adaptation priorities.

The document describes climate change impacts on the East Coast of Canada including that sea levels will rise, sea ice will decrease, and future coastal-erosion rates will likely increase in most areas. Prince Edward Island and other small islands are at the forefront of the impacts of climate change.

The primary challenge that climate change presents to Prince Edward Island is the impact of coastal erosion through storm surges and high water levels. The sensitive sand and sandstone shorelines across the province often experience erosion by water, waves, ice, and wind.

Sea level rise has been measured at Charlottetown, PEI to have increased by 36 centimetres over the past 100 years (1911-2011 from R.J. Daigle Enviro Consultant, 2012), and is anticipated to increase by a further 100 centimetres over the next 100 years (Intergovernmental Panel on Climate Change IPCC, 2013).

At the same time, crustal movement of the Earth's surface at Prince Edward Island is

lowering at 10 to 20 centimetres per century (Daigle, 2012) depending on the geographic area of the Island, which causes some concern about coastal erosion.

In terms of damaging storms, the Intergovernmental Panel on Climate Change (IPCC), the global community's scientific authority on climate matters, concluded that they were "virtually certain" that there had been an increase in intense tropical cyclone activity in the North Atlantic since the 1970s; and "more likely than not" that these intense tropical cyclones would increase in the North Atlantic in the late 21st Century (IPCC, 2013).

As a result of these anticipated ocean, geological and storm changes, coastal erosion is expected to continue and likely become more severe, threatening public and private infrastructure at great economic cost to the 3,295 kilometres of coastline on Prince Edward Island. In addition to the vulnerability of communities, tourism is often an economic generator of coastal communities.

Greater knowledge of coastal impacts, and appropriate mitigation and adaptation strategies are needed to support Prince Edward Island and other coastal areas across Canada and around the world.









# CLEANTECHNOLOGY INNOVATION IN SUPPORT OF AGRICULTURE AND AQUACULTURE

Through a highly-collaborative approach, research carried out by the Clean Technology Innovation in Support of Agriculture and Aquaculture will bridge the analysis of land- and water-based farming processes and practices with advancements in clean technology.

The approach and research focus serves to provide solutions to strengthen Canada's agriculture and aquaculture sectors in the face of climate change. The Centre pursues application and integration of existing technologies as well as the creation of novel clean technologies with the goal of enabling systems that are more robust, easily adopted, economical, and sustainable.

## **EXPERTISE**

Agriculture and aquaculture are major contributors to Canada's economy and identity. Together, these industries are responsible for creating significant wealth, jobs, and trusted food products for Canadians. Both industries generate significant greenhouse gas emissions and, symbolically, are highly sensitive to the effects of climate change. Climate, energy systems, ecosystems, and the activities of agriculture and aquaculture intersect and impact each other in highly complex ways making it difficult to predict and adapt to ongoing changes. As a result, it is challenging to make investment decisions and well-aligned policies to support the long-term sustainability of these sectors and the environment.

The Centre for Clean Technology Innovation in Support of Agriculture and Aquaculture brings together a world-class, multidisciplinary team of researchers and academics who work alongside industry partners and global research networks on a daily basis.

The intersecting specializations within the research cluster provide exiting new opportunities to advance science and applied knowledge in clean technologies and sustainable practices for agriculture and aquaculture.

Centre expertise includes researchers from the UPEI Centre for Veterinary Epidemiological Research (considered the world leader in its field of research), the UPEI Canada Excellence Research Chair in Aquatic Epidemiology, the UPEI School of Sustainable Design Engineering, the UPEI School of Mathematical and Computational Sciences, the globally-recognized UPEI Climate Research Lab, and UPEI Faculty of Science researchers from Environmental Studies, Foods and Nutrition, Chemistry, and Biology.

Centre expertise ranges from aquatic/livestock health management and data analytics, to renewable energy biosensor technology development. As a result, the Centre for Clean Technology Innovation in Support of Agriculture and Aquaculture is capable of providing new knowledge to inform farming practices from both technology and ecology standpoints to reduce environmental impacts, enhance production, and support long-term sustainability.

This knowledge equips those on the front lines of farming and environmental stewardship with the best strategies for a changing climate, and better informs commercial and regulatory decision makers.

Focus areas within the Centre include, but are not limited to:

- ✓ creation of comprehensive energy flow maps to identify and rank leverage points for emissions
  mitigation and adaptation strategies to improve the sustainability of land- and water-based farming
  operations;
- ✓ design and development of scalable agriculture and aquaculture pilot projects demonstrating optimized application of clean technology solutions; and
- ✓ the development of bio-sensing technologies to help keep land, water, and air healthy to sustain farming and livelihoods.

The Centre's strengths in bio-sensing technology development has considerable potential to lead to outcomes in enabling real-time environmental, crop, and animal monitoring to enhance farm productivity and assist farmers in short- and long-term decision making for the sustainable management of their farms and livestock. This clean technology is also capable of providing real-time data for provincial and federal policy makers regarding impacts of industry practices on climate change on farming practices.

The Centre's strengths in bioresources and sustainable energy bring complementary potential to improve farm operations at the process and energy system level to improve energy efficiency and identify new revenue opportunities. Possibilities include reducing energy costs and emissions through clean energy technologies, improving process efficiency through multidisciplinary system optimization, and enabling new by-product revenue streams through novel bioconversion processes.

### SCOPE OF RESEARCH AND COLLABORATIVE INTERESTS

- ✓ Assessment, analysis, and modeling of farm inputs, outputs, and processes to determine opportunities for decarbonisation efficiency improvement, by-product synergies, diversification of farming, and more adaptive and optimized farming methods.
- ✓ Evaluate, adapt, and develop clean technologies to monitor and improve farm processes (land- or water-based) to mitigate greenhouse gas emissions.
- ✓ Incubation and development of new clean technologies (including smart/real-time monitoring devices, precision instrumentation, bioconversion processes, and clean energy solutions) that are relevant, scalable, accessible, and easily adopted by a wide range of users.
- ✓ Support development of innovative biosensor technology by internal and external research partners through Atlantic Canada's only clean-room facility.
- ✓ Develop best practices for sustainability and retrofits of existing farm systems.
- ✓ Analysis of alternative crops, including low-cost, low-maintenance bio-energy crops.
- ✓ Support policy development for sustainable agriculture and aquaculture practice that enable transition to a low-carbon economy.
- ✓ Provide leading-edge HQP training and research opportunities for the next generation of agriculture, aquaculture and climate researchers.

# CLEAN TECHNOLOGY INNOVATION IN SUPPORT OF AGRICULTURE AND AQUACULTURE

RATIONALE: NEW TECHNOLOGIES TO REDUCE GHG EMISSIONS AND CLIMATE IMPACT

Agriculture and agri-food is a significant contributor to the Canadian economy, accounting for 6.6% of national gross domestic product (GDP) in 2014 (and more than 11% of the provincial gross domestic product in Canada). However, the industry is heavily reliant on fossil fuels for energy production and is responsible for more than 10% of Canada's greenhouse gas (GHG) emissions (Agriculture and Agri-Food Canada).

A unified effort by the farming community can facilitate a shift in production processes to achieve reductions in energy consumption and GHG emissions. Increasing energy efficiency on farm operations can improve overall profitability and reduce exposure to volatile energy prices.

Aquaculture represents about a third of Canada's total fisheries value and is divided between the Pacific and Atlantic coasts. In 2013, British Columbia accounted for almost half of the total production, followed by Newfoundland and Labrador and Prince Edward Island (15% each), New Brunswick (11%) and Nova Scotia (5%) (Department of Fisheries and Ocean).

The aquaculture industry generated more than \$1 billion in GDP in Canada in 2010 and employed 14,000 in full-time, well paying jobs that are primarily located in smaller coastal and rural communities. For aquaculture, primary greenhouse gas emissions come from the feed production stage and, therefore, GHG emissions can be improved through differing feed formulations, levels of intensification, and food conversion ratios. Measures to reduce emissions could be found in other areas of the production and supply chain system.

Canada's agriculture and aquaculture industries are highly sensitive to climate change. The impacts of climate change and a rising average global temperature can pose significant challenges for both industries. While benefiting from longer growing seasons and more frost-free days, Canada's agriculture industry will face more crop pests and disease. Canada's aquaculture industry may benefit from warmer water temperatures; however, there will be more pests and disease to combat.

Innovation and clean technology development are needed to reduce the impact of GHG emissions and climate change on important provincial, regional and national economic sectors.



## CLIMATE CHANGE AND HUMAN HEALTH



By collecting markers of human health and correlating these with environmental parameters, the Centre for Research Excellence in Climate Change and Human Health will develop unique datasets to assess how climate change is affecting populations and, through modeling and forecasting, how climate-related health impacts may occur in the future. The Centre's datasets will provide information to internal and external researchers for the purpose of scientific study, decision making, and development of innovative devices for use in monitoring and protecting health.

## **EXPERTISE**

All Canadians are vulnerable to the health impacts associated with climate change. Observations have been made of the following human health impacts: climate-related increases in exposure to elevated temperatures; more frequent, severe, or longer-lasting extreme precipitation events such as droughts or flooding; degraded air quality; diseases transmitted through food, water, and disease vectors (such as ticks and mosquitoes); and, stresses to mental health and well-being. Increased exposure to multiple health threats, together with changes in sensitivity and the ability to adapt to those threats, increases a person's vulnerability to climate-related health impacts. Social determinants of health infrastructure intensify the magnitude of climate change impact on health of populations.

The U.S. Global Change Research Program study *The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment* indicates that "while often assessed individually, exposure to multiple climate-change threats can occur simultaneously, resulting in compounding or cascading health impacts." (SGCRP, 2016: *The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment*. Crimmins, A., J. Balbus, J.L. Gamble, C.B. Beard, J.E. Bell, D. Dodgen, R.J. Eisen, N. Fann, M.D. Hawkins, S.C. Herring, L. Jantarasami, D.M. Mills, S. Saha, M.C. Sarofim, J. Trtanj, and L. Zisk, Eds. U.S. Global Change Research Program, Washington, DC, 312 pp. http://dx.doi.org/10.7930/JoR49NOX) While scientists are becoming more aware of the impacts of climate change on many existing health risks, further study is needed to better understand new health challenges that will occur due to climate change.

UPEI's Centre for Climate Change and Human Health focuses on data collection, analysis, interpretation, modeling, and forecasting of risks to human health. Together these activities provide valuable information to manage existing, and plan for future, health impacts of climate change, and contribute to the development of new technologies for real-time health monitoring.

UPEI experts in data analytics, biostatistics, epidemiology, sustainable design engineering, climate change, and health work together in the UPEI-based Centre for Climate Change and Human Health to determine climate change influences on human health and the best way to prevent or minimize negative health outcomes.

The Centre will leverage existing skills and expertise at UPEI including:

- the Centre for Health and Community Research (CHCR) (which is mandated to advance research, education, and knowledge within the fields of health and bioscience) and is home to the Secure Island Data Repository (SIDR) of administration health data on the UPEI campus, and
- the Chair in Human Development and Health and other human health experts within the UPEI School of Nursing, the Atlantic Veterinary College, UPEI Applied Human Sciences, UPEI Biology, the UPEI School of Sustainable Design Engineering, and UPEI School of Mathematical and Computational Sciences.

UPEI will attract additional researchers and experts from around the world during its October 2017 international symposium on *Climate Change and Human Health: A Global Challenge and Local Concern.* 

Working with highly qualified personnel, external research partners, health networks, and community partners, UPEI's strengths in health research are leveraged through the Centre to build unique and dynamic datasets within a secure data repository. Data can be accessed through physical and virtual environments to provide valuable information across cohorts and health conditions to identify climate change impacts on health. To reduce health inequities, the Centre will provide comparative data on health indicators for various populations, including First Nations communities. The Centre's ability to collect and measure biomarkers and other health indicators over time provides researchers and decision makers with critical data that can assist in developing new technology and policies to support population health and healthy adaptation to the effects of climate change.

Additionally, the Centre's comprehensive datasets provide evidence to build tools and apply these tools for the purpose of monitoring health. Medical biosensors, including point-of-care devices, are capable of monitoring a person's health in real time. These tools allow for testing health parameters anywhere, including remote or isolated locations. The devices bring data directly to researchers without the need for on-site personnel thus establishing a virtual system and reducing overall costs and burden.

## Scientific models saved lives from Harvey and Irma. They can from climate change too

Climate models have an even better track record than the weather models that saved lives in Texas and Florida (The Guardian, UK edition, September 18 2017)



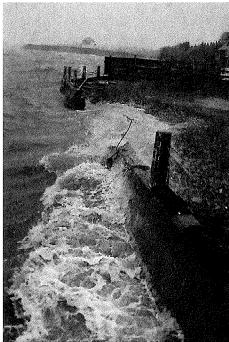
Traffic on the northbound lanes of Florida's Turnpike on Friday, Sept. 8, 2017, as motorists evacuated for the anticipated arrival of Hurricane Irma. (Photograph: Stephen M. Dowell/AP)

Through its integrated focus on high quality data and real-time monitoring, the Centre will create an infrastructure to help build expertise in climate change and its impact on human health. The Centre's commitment to collaborative research and training will further support industry potential in this area by optimizing capabilities to develop data and health specialists for future jobs and, to aid in stemming the outmigration of high quality personnel.

# SCOPE OF RESEARCH AND COLLABORATIVE INTERESTS

- Optimize a secure data repository to support researchers in their quest to advance knowledge of escalating climate change influences on health.
- Build unique and dynamic datasets to support research and decision making by means of data analysis, modeling, and forecasting through with risk assessments can be determined.
- ✓ Identify climate change related risks to human health with an emphasis on populations that are disproportionately vulnerable to climate impacts.
- Provide comparative data on health indicators to support communities disproportionately impacted by climate change to close the gap in health inequities.
- ✓ Through access to data, develop and apply/utilize tools (such as monitoring devices) that collect and mine relevant health data.
- Develop infrastructure for intersecting areas of data science, health analytics, and data visualization, including knowledge and skills expertise for data/health careers of the future.
- Provide data to support evidence-based decision making and policies in relation to health and climate change.







## CLIMATE CHANGE AND HUMAN HEALTH

RATIONALE: EVALUATION, MONITORING AND PROJECTING IMPACTS AND ADAPTATION STRATEGIES

All Canadians are vulnerable to the health impacts associated with climate change. Observations of human health impacts have been made of climate-related increases in exposure to elevated temperatures; and more frequent, severe, or longer-lasting extreme precipitation events such as droughts or flooding; and degraded air quality. Other impacts include diseases transmitted through food, water, and disease carriers such as mosquitos and ticks and other stresses to human mental health and well-being.

Increased exposure to multiple health threats, together with changes in sensitivity and the ability to adapt to those threats, increases a person's vulnerability to climate-related health effects. The impacts of climate change on human health interact with underlying health, demographic, and socioeconomic factors. Through the combined influence of these factors, climate change exacerbates some existing health threats and creates new public health challenges.

While all Canadians are at risk, some populations are disproportionately vulnerable to these risks including those with low income, immigrant groups (especially those with limited English proficiency), children and pregnant women, older adults, vulnerable occupational groups, persons with disabilities, and persons with pre-existing or chronic

medical conditions. Perhaps most vulnerable are Canada's First Nations people due to their close connection to nature, an environment under constant transformation with climate change. Canada's First Nations social, economic, spiritual lifestyles and overall health are all impacted heavily, and disproportionately, to climate change.

In recent years, scientific understanding of how climate change increases risks to human health has advanced significantly. Even so, the ability to evaluate, monitor, and project human health effects varies across climate impacts. For instance, information on health outcomes differ in terms of whether complete, long-term datasets exist that allow quantification of observed changes, and whether existing models can project impacts at the time and geographic scales of interest. Differences also exist in the metrics available for observing or projecting different health impacts. For some health impacts, the available metrics only describe changes in risk of exposure, while for others, metrics describe changes in actual health outcomes.

Greater understanding of the impact of climate change on human health is critical to better identify preventive and adaptive actions in the face of growing projected climate change threats.







# 3.0 CLIMATE CHANGE AND ADAPTATION HIGHER LEARNING PROGRAMMING WITHIN THE CANADIAN CENTRE FOR CLIMATE CHANGE AND ADAPTATION

# EDUCATING AND EQUIPPING THE NEXT GENERATION OF CLIMATE LEADERS WITH CRITICAL KNOWLEDGE AND SKILLS

Within the proposed Canadian Centre for Climate Change and Adaptation UPEI's Department of Science and School of Graduate Studies will deliver highly innovative and relevant programming a Bachelor of Science in Applied Climate Change and Adaptation and a Master of Science in Climate Change and Adaptation.

Approved by the UPEI Board of Governors, UPEI Senate, and Maritime Provinces Higher Education Commission (the regional authority for post-secondary programming quality assurance), UPEI's new Bachelor of Science in Applied Climate Change and Adaptation will examine theoretical aspects of how science, policy, and human populations interact in creating and solving climate change challenges, while engaging students in hands-on, technology-based learning.

The UPEI Bachelor of Science in Applied Climate Change and Adaptation is purposely innovative in design and delivery. In keeping with priorities outlined within the UPEI Strategic Plan and UPEI Academic Plan, the program strongly aligns with UPEI's vision to be a leader in experiential learning opportunities that encourage students to develop to their full potential in both the classroom and the community.

To make it unique to the region and country, UPEI brought together best practices of other successful climate programs throughout North America and Europe. The University also considered recent evidence-based results of the MPHEC Class of 2012 Maritime University Graduates: Pathways to Employments urvey.

This survey shows strong progression of graduates from Applied Arts and Sciences and Professional programs moving directly into the workforce after graduation. In addition, graduates of this group have demonstrated strong interest in pursuing a second credential or further studies—most notably, graduate studies.

The main objectives of the program include: developing climate leaders who understand essential biological and physical sciences and their processes in relation to climate; understand the broader social and economic policy implications of climate change; possess analytic skills that enable them to interpret, understand, and predict climate impacts and climate models; develop critical thinking skills to effectively evaluate evidence and processes, and make sound decisions on adapting to climate change; and continually develop their teambuilding, communication, and digital literacy skills that enable them to effectively collaborate and communicate.

The result is a program that will examine theoretical aspects of how science, policy, and human populations interact in creating and solving climate change challenges, while engaging students in hands-on, technology-based learning in an experiential manner beyond the traditional classroom and textbooks. For example, students will learn to use state-of-the-art drone technology and computer game programming surveillance instrumentation to develop skills to assess the vulnerability, impacts, and adaptation to climate change.

In addition to flying and immersing drones to gather data, students will learn, among other outcomes, to:

- ✓ use GIS to map and visualize climate change;
- ✓ analyze climate change in a way that takes future industry and community impacts real and tangible;
- ✓ design and set up climate stations;
- ✓ participate in United Nations-style climate governance summits; and
- ✓ examine paleoclimatalogical indicators of climate.

Students will further benefit from the program's concentration on hands-on learning and skill development through a high degree of small group exercises/projects, laboratory work, fieldwork, community engagement, and field courses — including two senior level field courses delivered by UPEI's educational and research partner The Smithsonian Institution.

Graduates of the program will have relevant knowledge and skills to compete for a diverse range of career opportunities related to science, social, and policy aspects of climate change in areas ranging from entrepreneur-based businesses to all levels of government. The program will also provide graduates with entry level requirements needed for many professional and graduate programs in related fields, including areas such as climate related science programs, meteorology, policy, law, public administration, data analytics, and more.

## UPEI Climate Change and Adaptation Programming A UNIQUE DELIVERY MODEL

- Applied learning
- Selective domestic and international student recruitment
- Living Laboratory' in rural PEI
- Problem solving with community and industry projects
- Student work-integrated-learning placements with organizations such as Parks Canada and other stakeholders
- International partners and recognition
- » Next generation leaders in climate change and adaptation



P.E.I. researchers using drones to fight coastal erosion

CBC News June 23, 2016 Terrence McEachern

Summer work-integrated-learning (WIL) opportunities with industry and government organizations will also differentiate the program. It is UPEI's intention that all students within the program will be employed during two summer WIL sessions, during which students are paid and earn program credits. A number of government and industrial partners have expressed interest in participating in climate-related WIL to advance their respective organizations' objectives while contributing to development of future skilled labour. The real-world experience gained by students will assist them in securing jobs upon graduation. The strength of the program's WIL aspect will aid in employer and community partnerships as it encourages the competencies and networks needed to "...build a highly skilled and productive labour force for an innovative, strong, and growing economy." (Canadian Chamber of Commerce on the benefits of WIL)

UPEI currently delivers an interdisciplinary liberal arts and science Environmental Studies program that offers a broad base of Arts, Science, and Business courses to provide students with the ability to understand environmental connections across fields. UPEI's Bachelor of Science in Applied Climate Change and Adaptation will build increasingly concentrated knowledge and application of fundamental sciences, incorporate new fields of study (such as data analytics focused on climate change, geographic information systems, and climate coastal sciences), and use technologies previously not used within UPEI curriculum, to leverage existing Environmental Studies strengths within the first two years of the new program. This complementary model will serve to build an emerging cluster of expertise at UPEI, and an enhanced level of faculty collaboration across disciplines.

Together, the existing Bachelor of Environmental Studies and new Bachelor of Science in Applied Climate Change and Adaptation will enable UPEI to develop a robust climate-concentrated undergraduate focus that will serve to develop career-ready professionals and a new generation of graduate students with broad environmental awareness and specialization in climate change science.

	LEARNING OUTCOMES FOR BACHELOR OF SCIENCE IN APPLIED CLIMATE CHANGE AND ADAPTATION
CLIMATE SCIENCE	<ul> <li>Physical basis of the natural greenhouse effect, and the human contribution to it</li> <li>How astronomical forces influence the earth's climate and their cycles</li> <li>Physical and chemical properties of the atmosphere that influence climate including the role of the cryosphere, oceans, land processes, etc.</li> <li>Greenhouse gases: their global warming potential, chemical make-up, and sources; quantify the human contributions globally, nationally, and provincially</li> <li>Paleological indicators of climate including ice cores, tree rings, sediment cores, etc.; how these indicators are collected; and what they tell us about past temperature changes</li> </ul>
CLIMATE OBSERVATIONS	<ul> <li>How the components of climate are monitored instrumentally including temperature, precipitation in its many forms, wind, solar radiation, atmospheric pressure, humidity, etc.</li> <li>History of written climate archives, how observations were collected, how they are digitized, then input several pages into climate dataset</li> <li>Databases, how they are organized, software available to assist, how climate records are organized</li> <li>Plan and execute setting up climate station that reports to a UPEI database</li> <li>Online climate records and where they are located, download climate records, organize climate records, quality control climate records</li> <li>How to analyze climate trends, calculate climate indices</li> </ul>
SCENARIOS OF FUTURE CLIMATE	<ul> <li>Global climate models, regional climate models, climate model downscaling</li> <li>Representative concentration profiles and future climate scenarios</li> <li>International climate modeling centres and variations of climate models</li> <li>Online GCM output from 50 models, download climate model output, validate climate models against observations</li> <li>Projections of future climate for PEI and other locations around the world</li> <li>Dealing with uncertainty in climate models</li> </ul>
MAPPING AND VISUALIZATION OF CLIMATE CHANGE	<ul> <li>Concepts and operation of a geographic information system (GIS)</li> <li>Mapping of climate zones and climate impact regions</li> <li>Operations of a small unmanned aerial vehicle including rules and regulations, piloting, flight planning, data conversion, data management, sensor availability</li> <li>Visualization of climate change to motivate climate change adaptation</li> </ul>
CLIMATE CHANGE IMPACT AND ASSESSMENT	<ul> <li>Impacts of climate change on all economic and ecological sectors including sensitivity to climate parameters including temperature, precipitation, wind, etc.</li> <li>Impacts of climate change on coastal erosion, sea level and storm surges</li> <li>How to apply international standards for the Climate Change Impact Assessment process</li> <li>Impacts of climate change on flooding; precipitation intensity, duration and frequency curves for return periods; and flooding insurance</li> <li>Dealing with probability in climate impact assessment</li> </ul>
CLIMATE CHANGE MITIGATION AND ADAPTATION	<ul> <li>National GHG contributions focusing on Canada's place in the world and provincial (especially PEI) contributions under a Climate Change Pan-Canadian Framework</li> <li>Methods for reducing GHGs including renewable energy, energy conservation and innovation</li> <li>Inevitability of climate change adaptation, its definitions, classifications, and measurement</li> <li>Climate change adaptation measures across all economic and ecological sectors</li> </ul>

	LEARNING OUTCOMES FOR BACHELOR OF SCIENCE IN APPLIED CLIMATE CHANGE AND ADAPTATION
CLIMATE GOVERNANCE	<ul> <li>United Nations and international climate governance</li> <li>History of international GHG regulation and management leading to the UNFCCC, the Kyoto Protocol, and the Paris Agreement</li> <li>Business risks in an era of climate change including physical, legal, regulatory, reputational, and insurance risks</li> <li>Carbon accounting and measuring your carbon footprint</li> <li>Environmental (climate) management in Canada, and in the provinces (focusing on PEI)</li> </ul>
CLIMATE CHANGE AND SOCIETY	<ul> <li>Implications of climate change on migration patterns</li> <li>Understanding cross-societal impacts of climate change (rural vs. urban, developing vs. developed countries)</li> <li>Effects of climate change and adaptation upon traditional cultures, groups, and societies</li> <li>Climate change, food security, and resource depletion</li> </ul>
CLIMATE CHANGE AND INDIGENOUS CULTURE	<ul> <li>Implications of climate change and adaptive strategies for Indigenous communities across different jurisdictions</li> <li>Effects of climate change upon treaty processes and land claims</li> <li>Responding to changes in Indigenous ways of life and implications for future policy-making and decision-making</li> </ul>
CLIMATE POLICY	<ul> <li>Strategies for communication and dissemination of scientific data to a general audience</li> <li>Understanding how government policies are formulated in the context of theories of policy decision-making</li> <li>Understanding factors that determine government willingness to formulate climate related policies</li> <li>Understanding and evaluating climate change policy within the context of international relations and governance</li> <li>Understanding history of climate change policy</li> <li>Multilateral vs. bilateral agreements</li> </ul>
ECONOMICS OF CLIMATE CHANGE	<ul> <li>Effects of increased storms and disaster management</li> <li>Understanding and planning for compensation (international, regional, and local)</li> <li>Economic development, adaptation</li> <li>Challenges for budgeting models and projections</li> </ul>
CLIMATE CHANGE AND HUMAN BEHAVIOUR	<ul> <li>Psychology of denial and trauma</li> <li>Ethics and morality related to uneven effects of, and culpability, for climate change</li> <li>Climate change and religion in a cross-cultural context</li> <li>Climate change and the social contract</li> </ul>

## **UPEI MASTER OF SCIENCE IN CLIMATE CHANGE AND ADAPTATION**

The UPEI Master of Science in Climate Change and Adaptation (currently in development), is being designed based on best practices of leading climate change programs in North America and Europe. The intent of the one-year program will be to:

- contribute to increasing demand for scientists and professionals who are capable of contributing to climate change solutions within industry, all levels of government, and NGOs via progressive policy development, well-informed decisions, and strong collaborative approaches; and
- build capacity needed for effective evidence-based decision-making, innovation, entrepreneurial start-ups, and solutions needed to advance Canada's clean growth economy.

To expand the reach of its program to working professionals, the UPEI Master of Science in Climate Change and Adaptation will be delivered online to a maximum cohort of twenty students per intake, with an immersive four-week capstone experience onsite at the Canadian Centre for Climate Change and Adaptation. This onsite experience will provide Master students with highly interactive opportunities to engage in fieldwork, further develop technology-based skills, utilize leading-edge research equipment, and build collaborative networks.

The Prime Minister of Canada, the Right Honourable Justin Trudeau, has addressed the need for Canada to do more to address the global challenge of climate change indicating that "...our government is making climate change a top priority [which is] necessary for our collective health, security, and prosperity...".

In pursuing climate change advances, the Government of Canada have established clear objectives and principles of acting based on the best scientific evidence and advice; development and implantation of policies that contribute to a low-carbon economy; the need for individuals to take leadership roles on climate change including community mobilization, innovation, and sharing knowledge with developing countries.

These objectives are only attainable through individuals possessing climate change expertise and the ability to translate that knowledge into effective collaborations with a wide variety of stakeholders.

The Province of Prince Edward Island is strongly committed to support the Federal Government's action plan on climate change, by supporting the integration of adaptation strategies into economic sectors while growing R&D related to climate change innovation and start-ups.

Locally, indications are strong that progressive climate change practices will be integrated into traditional and emerging economic sectors—including agriculture and aquaculture, fisheries, and tourism—to ensure sustainable practices.

Together, federal and provincial governments' stated priorities indicate a trajectory for growth in demand for individuals with expertise in climate change who are capable of spearheading change and working collaboratively towards solutions.

The ability to respond to such demand for expertise can only be fostered through higher learning and strong collaborative partnerships.





## UPEI's climate programs and partnerships will work to:

- build capacity to support evidence-based decision making that will benefit
   Canada in terms of government policies and actions in long-term climate mitigation and adaptation, and economic investment in infrastructure; support for the sustainability of agriculture, fisheries, aquaculture and other key economic sectors in relation to climate change mitigation and adaptation; advancement of knowledge of municipalities and industry associations in climate change
- improve assessment of climate risk and impact in relation to critical infrastructure, key sectors and industries and impacts such as coastal erosion, that are critical to the regional economy
- improve observation, monitoring, and surveillance networks that directly impact climate-related health, wildlife and ecosystem health, food production and supply (climate science, climate observations, scenarios of future climate, mapping and visualization of climate change, climate mitigation and adaption, economics of climate change, etc.)
- contribute to developing the "clean growth economy" through higher learning and research, as well as advancing economic knowledge of climate change impacts
- provide vital support for private businesses, entrepreneurs, and startups that is needed to transform knowledge and research into action to support clean technology development



## 4.0 RESOURCES TO FULFILL OUR POTENTIAL

UPEI has an outstanding number of existing faculty and leaders who can directly contribute to the success of the new Canadian Centre for Climate Change and Adaptation—including expertise in the areas of climate change, science, environmental studies, policy development, business, technology, and engineering. In addition, UPEI will make strategic faculty hires of experienced leaders who truly appreciate and understand the power of collaborative and mutually beneficial partnerships with industry, bring expertise to the focus areas and are eager to build interdisciplinary teams, and who will exemplify the core values and strategic goals of the new Centre.

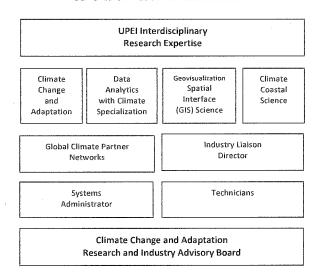
## **RESEARCH EXPERTISE**

The Research Centres of Excellence will include a core team of research experts from UPEI as well as the University's global partner network.

## Associate Professor, Climate Change and Adaptation

Dr. Adam Fenech has worked extensively in the area of climate change since 1988 starting at the Toronto Conference on the Changing Atmosphere and the IPCC First Assessment Report. Dr. Fenech shared in the 2007 Nobel Peace Prize for his work with the Intergovernmental Panel on Climate Change. He has edited 7 books on climate change over the past 7 years, most recently as editor of the international journal on Climate Impacts and Adaptation Science. Dr. Fenech has taught at the University of Toronto since 1998, and lectures regularly at universities across Canada and around the world. He joined UPEI as Director of the Climate Research Unit.

Collaborative Research Network Centres of Research Excellence



PhD in Data Analytics or Statistics: This researcher will have a research and teaching record of demonstrated excellence in areas related to *Big Data Analytics*. Preference will be given to an individual who has a specialization in an area related to climate science (such as climate change, ocean science, environmental science, disaster risk assessment, or public health) and an interest in interdisciplinary collaboration.

PhD in Geovisualization and Spatial Interface Science (GIS): This researcher will have demonstrated teaching ability, research experience in innovative technology applications for solutions to real world environmental problems, and collaborative relationship building skills. The position will lead innovation in the areas of new interface technology design, empirical human interface use evaluation, and new theory development about engagement of humans and information through the use of these technologies. Research will focus on geospatial tangible augmented reality, mobile geospatial augmented reality, and serious games as applied to real environmental, especially climate change and challenges.

PhD in Climate Coastal Science: This researcher will have a PhD in Costal Engineering or equivalent and demonstrated teaching ability, research experience in innovative technology applications for solutions to real world environmental problems, and collaborative relationship building skills. The position will lead innovation in the area of helping landowners promote the protection of properties from coastal flooding; inland flooding; wave damage; erosive shores; sea-level rise; and dynamic beaches. Research will focus on the feasibility and development of alternatives to adapt to coastal erosion; evaluating, designing, and helping construct projects to protect infrastructure and people; assessing regulatory and environmental efforts for coastal infrastructure protection; and promoting protection of coastal properties.

Four **Technician** positions will be established to work with the research teams. These individuals will have research experience with backgrounds in areas related to environmental science and climate change.

A **Systems Administrator** will be hired to support the day-to-day activities of the School. **Sessional lecturers** will also be engaged to develop and deliver the undergraduate and graduate programs.

**Diverse and complementary expertise at UPEI** from across various disciplines will work closely with the teams of the Centre and Research Centres of Excellence to advance industry collaboration projects and research projects.

UPEI will leverage its growing **Global Climate Partner Networks** to secure specific areas of expertise to support research projects and initiatives. The Research Centres of Excellence will also work with Adjunct Professors including a Parks Canada Scientist with climate and culture impact expertise, a Senior Conservation Biologist and other researchers with relevant expertise from The Smithsonian Institution.

UPEI will form an **Advisory Board** modeled after similar successful research and industry-focused Advisory Boards currently in place for programs such as the UPEI School of Sustainable Design Engineering and the UPEI School of Mathematical and Computational Sciences.

Securing support from federal and provincial governments to establish the Canadian Centre for Climate Change and Adaptation and effectively engage leading climate researchers is required to maximize knowledge transfer and applied research to benefit sustainable environments and economies regionally and nationally.

# EXPECTED OUTCOMES: ADVANCEMENT, CAPACITY BUILDING, AND ACCELERATION

The Canadian Centre for Climate Change and Adaptation proposes to mobilize new knowledge and expertise in climate change through the advancement of higher learning, building research expertise and supporting evidence-based decision making, and accelerating innovation in relation to climate change, adaptation, and resilience. This will be done through a highly-collaborative approach involving undergraduate and graduate students, expert faculty, and visiting researchers, working with community, industry and government. These outcomes are anticipated to generate benefits on a local and national scale with the potential for lessons learned to be applied internationally.

	Expected Outcomes
Advancement of Higher Learning	Foster the development of the next generation of climate leaders who will emerge from their studies to excel and contribute to the betterment of our local and global communities  Provide students with unique, experiential 'real world' learning opportunities in climate change
Building Research Capacity in Climate Change and Adaptation	Improve assessment of climate risk and impact in relation to key sectors and industries (such as agriculture, aquaculture, tourism, construction), critical infrastructure, and impacts such as coastal erosion, that are essential to the prosperity and growth of the regional economy Improve observation, monitoring, and surveillance networks that directly impact climate-related health, wildlife and ecosystem health, food production and supply (climate science, climate observations, scenarios of future climate, mapping and visualization of climate change, climate mitigation and adaption, economics of climate change, etc.)
Building Capacity in Evidence- Based Decision Making	Build capacity in the <b>development of government policies and actions</b> in long-term climate mitigation and adaptation, and economic investment in infrastructure
	Build capacity to support the sustainability of agriculture, aquaculture, tourism and other key economic sectors in relation to climate change mitigation and adaptation, and realize economic opportunities related to new technology adoption
	Build capacity to advance the knowledge of municipalities and industry professionals including engineers, land-use planners, natural resource managers, and others in climate change
Acceleration of Innovation	Contribute to the development of a "clean growth economy" through higher learning and research, as well as advancing economic knowledge of climate change impacts
	Provide vital support for private businesses, entrepreneurs, and start-ups that is needed to transform knowledge and research into action to support clean technology development
	Support key economic sectors in realizing economic opportunities related to new clean growth technology adoption, scalable technologies

## SUPPORTING CLIMATE CHANGE ADAPTATION IN THE COMMUNITY & A CLEAN GROWTH ECONOMY

This transformative, unique in Canada approach to climate change and adaptation research will greatly benefit local, regional, and national economies, in addition to the long-term sustainability of communities and the well-being of citizens.

### NATIONAL AND REGIONAL RELEVANCE

There are significant benefits of critical magnitude and relevance directly associated with the proposed Centre and research cluster. These include, but are not limited to:

- growth in the skills, knowledge, and understanding necessary to build capacity in decision making and policy development in sectors to Atlantic Canada – this cannot be understated
- further advancement of knowledge, adaptation, and mitigation strategies working with First
   Nations and population that are particularly vulnerable to climate change (such as Lennox Island, PEI)
- development of much needed collaborative projects with industry to address challenges and opportunities through development and adoption of new scalable and practical clean technology products and solutions that will lead to entrepreneurial ideas and advances in climate change mitigation, resilience, and adaptation strategies greatly improved 'local' knowledge about climate change impact and resilience—which research shows the to be of critical importance in climate change adaptation to support a clean growth economy and related economic benefits associated with this high growth sector (direct, indirect and induced spin offs and good jobs for Canadians)
- capacity building and knowledge acquisition among land use planners, engineers and other
  professional and industry sectors responsible for considerable planning, decision making, jobs
  and prosperity, and overall economic impact
- research development and dissemination of information to support the sustainability of
  agriculture, fisheries, aquaculture, tourism and other traditional and emerging sectors that are
  key to economic prosperity and quality of life

- positive impacts to address national concerns about the growing cost of climate change on Canada's prosperity, public health, and in coastal areas. (The National Round Table on the Environment and the Economy, a government-funded think tank, estimated the cost of climate change for Canada at \$5 billion per year in 2020 increasing to between \$21 billion and \$43 billion per year by 2050. Source: http://www.cbc.ca/news/politics/climate-change-could-cost-billions-a-yearby-2020-1.1097373)
- acting on climate change through adaptation and mitigation strategies is a key way to drive down
  costs and will reduce associated risks including to critical infrastructure, food security, human
  health, and economic growth these areas are priorities nationally and internationally
- the continuation of a strong and vibrant university generates direct, indirect, and induced economic spin off in the provincial economy including with the attract of leading researchers to live and work in Prince Edward Island

## COMMUNITY RELEVANCE IN RURAL PEI

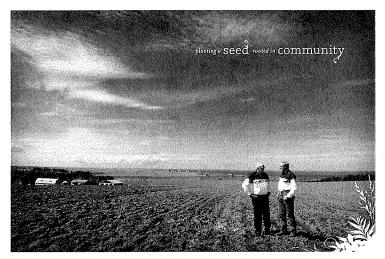
Positive impacts on the community of St. Peters and the surrounding area include, but are not limited to:

- direct, indirect, and induced economic spin off as a result of more dollars spent in the rural community
- greater diversity in the community as a result of researchers, faculty, visiting researchers, and students of different backgrounds, experiences and cultures from around the world interacting with local residents
- increased visitation in the longer-term from visitors, development of businesses to deliver products and services, and potential experiential tourism offerings through Parks Canada – a priority of the Prince Edward Island tourism industry



Climate Change and Aquaculture

A science symposium to communicate current research and science activities to the Atlantic Region's aquaculture industry







## 5.0 PROPOSED PROJECT COSTS & FINANCING

## CREATING A WORLD-CLASS LIVING LAB

The Canadian Centre for Climate Change and Adaptation, including the four Research Centres of Excellence, will be located at a new UPEI satellite campus in St. Peter's, PEI near Greenwich National Park.

An ideal 'living laboratory', Greenwich provides unique learning and research opportunities as it is home to an extensive, fragile coastal dune system, wetlands and various natural habitats in which numerous rare plant species are found. The unusually large and mobile parabolic dunes with their associated counter ridges are rare in North America.

Greenwich is also noted for its cultural and historic assets including traces left by early Aboriginal peoples, the Mi'kmaq, French and Acadian settlers, and Scottish, Irish, and English immigrants.

This unique approach supports the University's priority to build upon the wealth of resources within UPEI and the province by further developing unique relationships, programs, and initiatives that promote PEI as a living laboratory in which complex and relevant questions are explored through a sustainability lens to create new knowledge.

## **FACILITY OVERVIEW**

The new Canadian Centre for Climate Change and Adaptation facility will include four Research Centres of Excellence, multipurpose space, project-based meeting space, innovation collaboration space, student residence, storage, repair shop, greenhouses, a research garden, and office space.

Common area space within the facility will be designed to encourage faculty, researchers, students, and partners to interact, fuelling innovation and integration of research focus areas.

In keeping with climate action priorities, it is proposed that the new facility be constructed and operated in a sustainable manner. The building's high efficient design features will include renewable energy sources such as wind and solar, geothermal heating and a green roof.

Initial assumptions regarding the gross facility size indicate the need for a building of approximately 36,000 square feet. The estimate was developed through careful consideration of the ideal space for collaboration and research excellence.

## PROPOSED CAPITAL COSTS

UPEI is currently in the process of acquiring land in the St. Peters and Greenwich area of rural PEI and estimates land, land improvements, and site customization costs to be

	Year One to
Land, land improvements, and	
site customization	
Building	
Specialized equipment and	
leading-edge technology	
Computer equipment	
Furniture and fixtures	
Total	

**Table 1: Estimated Total Capital Costs** 

UPEI engaged Nine Yards Studio to prepare a preliminary concept-level design and capital cost estimate for the new facility.

The preliminary construction budget estimate is per square foot, exclusive of specialized technology and equipment. On this basis, the capital costs for the construction of the facility are estimated to be

Although the estimated cost is significant, investing in energy efficiency up front makes the facility more financially sustainable in the long-term, and sends a clear environmental message that is core to the overall purpose of the facility.

	Year One to Three
Research Centres of Excellence	
Residence	
Multipurpose space	
Innovation Collaboration Space	
Storage, repair shop	
and greenhouses	
Total	

**Table 2: Estimated Building Costs** 

# SPECIALIZED EQUIPMENT AND LEADING-EDGETECHNOLOGY

Access to specialized equipment and leading-edge technology is vital to administering educational programming and advancing research in the area of climate change and adaptation.

Through extensive consultation with faculty and industry experts, UPEI has identified the technologies and equipment required for the Canadian Centre for Climate Change and Adaptation and Research Centres of Excellence. Specialized equipment and leading-edge technology are estimated to be (Table 3).

Field monitoring kits and supplies include: climate station array measuring temperature, precipitation, solar radiation, humidity, atmospheric pressure at 100 locations across Prince Edward Island; sea level station array measuring sea level, water temperature and alkalinity at 100 locations around Prince Edward Island; data loggers and telemetry systems for real-time data capture and reporting; climate "data pods" of computer cubicles equipped with geographic information system computers and software for data analysis, visualization and presentation; and large public electronic real- time geographic displays of environmental data.

**Communications technology** needs include laptops and a dedicated computer server for data storage and big data management. The rural location of facility poses some challenges for connectivity between datagathering devices, researchers, and partners.

Investment in high-quality infrastructure such as computers, networks, servers, and security for movement and management of big data is crucial to the success of the programming andresearch being conducted through the Centre and Research Centres of Excellence.

	Year One to Three
Small, unmanned air vehicles (sUAVs)	
Aerial sensor packages	
Real-time kinetic global positioning systems	
Field monitoring kits and supplies	
Other (research boat, trailer, backup generator)	
State-of-the-art communications	
infrastructure, computer equipment,	
networks, servers, and security	
systems for data storage and	
management	
Total Leading-Edge Technology	
and Equipment	

Table 3: Estimated Leading Edge Technology and Equipment Costs

Research Centre specific specialized equipment and leading-edge technologies are identified below.

The Centre for Data and Policy Analysis for Transition to Low-Carbon Economies and the Centre for Climate Change and Human Health includes wind turbines, wave and tidal turbines, solar panel arrays, geothermal and biogas infrastructure for residential, commercial, and community development perspectives; sustainable facilities and smart devices to control energy supply; working labs, and substantial data management

processing systems such as servers, networks, data storage, backup systems, and wireless internet with significant capacity for rapid growth.

The Centre for Coastal Systems Impacts includes research-grade Small, Unmanned Aerial Vehicles (sUAVs) for high precision mapping of coastal regions and an array of sensors; small unmanned above and under water vehicles and an array of sensors; floating global positioning systems for geospatial locating; sensory floating buoys.

The Centre for Clean Technology Innovation in Support of Agriculture and Aquaculture includes:

- ✓ a wave/coastal testing water tank ideal for aquaculture and coastal erosion work;
- an offshore floating wind and wave power project renewable energy demonstration for powering floating aquaculture farms (first grid-connected offshore wind turbine in Canada);
- ✓ an array of chamber-based greenhouse gas measurements over agricultural fields;
- an array of sensors for environmental measurements over agricultural fields (including soil and ambient temperature, soil moisture and humidity, and solar radiation); and
- electric agricultural vehicles and an electric charging station.

Detailed financial projections are presented in Appendix I, *Projected Statements of Operations*.

# START UP AND INDUSTRY COLLABORATION LAUNCH

For the Canadian Centre of Climate Change and Adaptation and Research Centres of Excellence hosted at UPEI to be considered a success, it must attract a substantial number of industry collaboration and industry-based research projects. For this reason, significant efforts will be made from years one to year three to establish and develop strong relationships with both regional and international industry and research partners.

UPEI will require non-repayable start up contributions from government sources in the amount of power the first three over the first three years to launch industry collaboration and partially fund the start up of the four Research Centres of Excellence. After year three, through industry collaboration and Research Centres of Excellence, UPEI expects to secure large-scale industry and research projects that will translate into increased research revenue.

## PROPOSED CAPITAL FINANCING

For the purpose of budgetary and planning purposes, the proposed financing structure is as follows (Table 4):

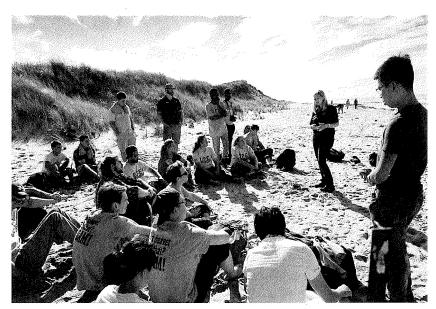
Fundacione and denotions	Year One to Three
Fundraising and donations  Non-repayable government start  up contributions	
Non-repayable government capital contributions	
Total Proposed Project Financing	

**Table 4: Total Proposed Project Financing** 

An investment in the establishment of the Canadian Centre for Climate Change and Adaptation and Research Centres of Excellence is an investment in our collective health, security and prosperity. UPEI can play a significant role working with leading climate experts, government, non-government, community and industry partners to advance research, knowledge, and mobilization of climate change and adaptation — one of the greatest challenges of our time.

UPEI Sustainable Design Engineering Student Orientation at the Greenwich National Park near St. Peter's PEI.

UPEI enjoys a strong partnership with Parks Canada that includes research, service, and community outreach projects relating to sustainable design engineering, climate change, wildlife, and biology at Greenwich.





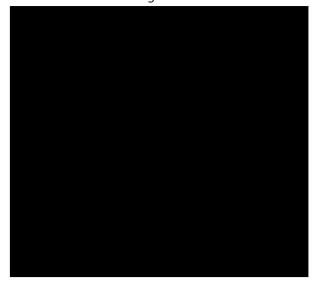
## 6.0 OPERATIONS

## OVERVIEW OF KEY OPERATIONAL ASSUMPTIONS AND FINANCIAL IMPACT OF ALTERNATIVE APPROACHES

## NUMBER OF STUDENTS

UPEI will intentionally maintain a competitive and capped enrollment to enhance the quality of education and the exclusivity of its Bachelor and Master programs. Maintaining smaller cohorts of students will allow for students to have greater access to experienced faculty and resources,

while at the same time creating a highly-collaborative learning environment.





ATIA - 13(1)(c) ATIA - 20(1)(c) ATIA - 20(1)(d)

Canadian Centre for Climate Change and Adaptation: Business Plan





Canadian Centre for Climate Change and Adaptation: Business Plan



#### 7.0 PROJECT GOALS & NEXT STEPS

The following goals and next steps are recommended for the period from September to December 2017:



#### **APPENDIX I:**

PROJECTED STATEMENTS OF OPERATIONS

## Page(s) 352 to 371 are withheld pursuant to paragraph 20(1)(b), 20(1)(c), & 20(1)(d) of the Access to Information Act

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#### **APPENDIX II:**

#### PRELIMINARY CONCEPT-LEVEL DRAWINGS

THE CANADIAN CENTRE for CLIMATE CHANGE AND ADAPTATION AND RESEARCH CENTRES OF EXCELLENCE

PRELIMINARY CONCEPT DESIGN

THE CANADIAN CENTRE FOR CLIMATE CHANGE AND ADAPTATION AND RESEARCH CENTRES OF EXCELLENCE PRELIMINARY CONCEPT DESIGN

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## Page(s) 374 to 376 are withheld pursuant to paragraph 13(1)(c) of the Access to Information Act

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## APPENDIX III: THE ROLE OF CONSULTATIONS IN ADVANCING THE SHARED CLIMATE AGENDA

#### ADAPTATION AND MOBILIZATION: KEY STAKEHOLDER STRATEGIC ADVICE

In September 2016, UPEI hosted a symposium in which it sought the expertise and input of a diverse group of expert stakeholders to determine how to best build capacity in relation to:

- climate change knowledge and the impact of this knowledge, and
- how to build upon the University's strengths in climate change to create a living lab on Prince Edward Island through which students, researchers, industry, government, and community partners could come together to provide solutions to climate challenges.

#### SYMPOSIUM PARTICIPANTS

SYMPOSIUM HOST

Dr. Alaa Abd-El-Aziz, President and Vice-Chancellor, University of Prince Edward Island

SYMPOSIUM PARTICIPANTS (in alphabetical order)





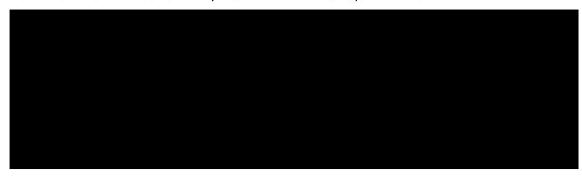
#### **GUEST SPEAKERS**



GUESTS WHO WERENOTABLETO ATTENDTHE SYMPOSIUM BUTPROVIDED A LETTER OF SUPPORT

**Dr. Francisco Dallmeier**, Senior Conservation Biologist, Smithsonian Institution

OTHERS WHO WERE CONSULTED/PROVIDED EXPERTISE &/or LETTERS OF SUPPORT



#### **KEY THEMES**

Key themes discussed during the symposium are as follows:

- a strong need exists to facilitate the building of capacity to take action in climate change and adaptation that supports the transfer of knowledge to inform public policy and that fosters innovation working with industry and community;
- UPEI has an opportunity to provide a distinct, unique offering and applied focus that supports climate change action and that mobilizes knowledge into the community, transforming research into action on a local and national scale with lessons learned applied internationally;
- UPEI has demonstrated ability to offer unique problem-solving, hands-on experiences and community work-integrated learning including where students work on projects with community and industry to address specific challenges on a fee-for-service basis;
- there is benefit in engaging citizens in research projects, such as local data collection (building on the current projects of the UPEI Climate Research Lab), to encourage greater community involvement in climate change initiatives and adoption strategies;
- UPEI has existing strengths through its UPEI Climate Research Lab, and other synergistic and interdisciplinary expertise at UPEI, to develop new climate change knowledge and action;
- climate change and adaptation are extremely relevant to local, national, and international economies;
- attracting domestic and international students and visiting researchers through unique programming, technology, research, and expertise will expand the ability to apply climate solutions broadly;
- UPEI has strong national and global climate networks on which to draw expertise for the development and delivery of climate change programming and innovation;
- there is a timely opportunity to build a strong, unique brand (including discussions about use of Greenwich) of benefit to many stakeholders.

As a result of the symposium, several key findings became apparent.

- 1. A need exists for unique and progressive higher learning programs in climate change that can anchor development of new knowledge and, ultimately, the capacity needed for evidence-based decision making required to make a true difference in transitioning to a clean growth economy.
- 2. UPEI has a world-class opportunity to develop an educational, research, and global outreach hub and living lab in partnership with the Parks Canada National Park at Greenwich.
- 3. The collaborative partnership between UPEI and Parks Canada has great potential to further the mandates and shared priorities of both organizations in meaningful ways for Canadians.

- 4. The concept of a hub for climate change and adaptation higher learning and research has the ability to foster innovation, incubation of ideas, and entrepreneurship related to climate change and the clean economy in a manner that could realistically establish UPEI as an agent of climate change action with lessons to share on a global scale.
- 5. Primary industry sectors, such as agriculture and aquaculture, fisheries, and tourism, as well as other sectors, municipalities, and professional organizations will benefit directly from the development of new knowledge and climate solutions.

The consistent message which emerged throughout the symposium was that UPEI should accelerate efforts to greatly accelerate and enhance its existing focus on climate change research and community mobilization for the benefit of our communities and future climate leaders.

UPEI was very pleased with the level of support and commitment for the proposed new direction provided during all stakeholder consultations. A report on the symposium and outcomes, including a detailed list of stakeholders, is provided in Appendix IV.

Further internal and external consultations with stakeholders, including the community of St. Peter's, are scheduled to take place at the appropriate planning stages.

#### **APPENDIX IV:**

BUILDING CAPACITY IN
CLIMATE CHANGE ADAPTATION AND RESILIENCE

PHASE ONE REPORT: SYMPOSIUM SUMMARY FEEDBACK

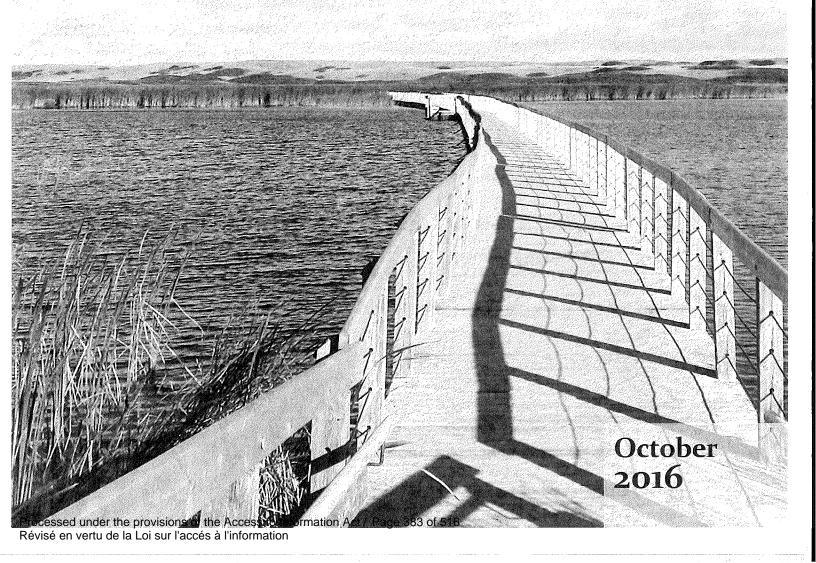
Symposium hosted by:



UPEI Climate Research Expertise Building Capacity in Climate Change Adaptation and Resilience

**Phase One Report:** 

Symposium Summary Feedback



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#### 1. BACKGROUND

The University of Prince Edward Island (UPEI) and Parks Canada enjoy a strong, collaborative partnership built on shared goals that support education, scientific discovery, and community outreach in novel and exciting ways.

Building on this strong partnership, UPEI and Parks Canada originally identified the concept to establish the *Institute for Climate Change Adaptation and Resilience* at Prince Edward Island National Park's Greenwich Interpretation Centre (St. Peters Area, PEI) – a location that provides a natural and cultural setting with significant potential to function as a world class 'living lab' (Appendix A).

In September 2016, the University of Prince Edward Island hosted a symposium involving leading research, industry, government, and community representatives with national and international connections. The overall objective of the Symposium was to discuss, explore, validate, and further define the proposed concept for the Institute for Climate Change Adaptation and Resilience.

Appendix B includes a list of Symposium participants as well as guest speakers who shared sector insights and lessons learned for consideration during the discussions about the proposed Institute. Appendix C provides an overview of secondary review and analysis of other institutions which was conducted in preparation for this symposium.

The Symposium began with an overview of the proposed concept and additional background on the strategic priorities of the University of Prince Edward Island including internationally recognized expertise in climate change, and Parks Canada.

The key findings from the Symposium are summarized in this document and help to inform the next steps of the planning process. After reflecting on the participant feedback, UPEI has further conceptualized the direction for *Building Capacity in Climate Change Adaptation and Resilience*. A high-level overview of this evolved concept is presented in Section 3 of this report. The combined findings presented in this document will help to inform the development of a detailed business plan, as outlined as part of the next steps found in Section 4 of this report.

#### 2. KEY SYMPOSIUM RECOMMENDATIONS

The key recommendations identified by Symposium participants are presented below.

#### World-Class Research Hub and Strong Collaborations

Participants described the Institute as a hub that connects community and industry with researchers, becoming known for world-class research, collaboration and developing solutions. The Institute would create an environment that facilitates the building of capacity in climate change, as a think tank (both physically and virtually), and that fosters innovation, the incubation of new ideas, and entrepreneurship related to climate change.

Collaborative efforts in Greenwich would involve researchers, academia, government, community, Aboriginal, industry, and other visitors from around the world. This activity will support a vibrant community in St. Peters Area and generate incremental economic activity that benefits local and provincial economies.

#### Climate Change Solutions and Action Focus

A consistent theme is for the Institute to focus on action, becoming an agent or instrument of change. This action was described as a distinguishing factor of the Institute, specifically, building capacity in PEI to take action and use evidence-based decisions to enable lessons learned on a global scale. In addition to transforming research into action locally and internationally, participants spoke about advancing research and informing public policy. This feedback is consistent with the proposed concept of the Institute becoming a 'living lab' in Greenwich (St. Peters Area) (Appendix A).

FutureEarth Research for Global Sustainability "Knowledge-Action Networks, a collaborative framework that facilitates highly integrative sustainability research." Dr. Gordon McBean

Future Earth is a major international research platform providing the knowledge and support to accelerate transformations to a sustainable world. Launched in 2015, Future Earth is a 10-year initiative to advance Global Sustainability Science, build capacity in this rapidly expanding area of research and provide an international research agenda to guide natural and social scientists working around the world. (http://futureearth.org)

The Woods Hole Oceanographic Institution is "committed to understanding all facets of the ocean as well as its complex connections with Earth's atmosphere, land, ice, seafloor, and life—including humanity. This is essential not only to advance knowledge about our planet, but also to ensure society's long-term welfare and to help guide human stewardship of the environment. WHOI researchers are also dedicated to training future generations of ocean science leaders, to providing unbiased information that informs public policy and decision-making, and to expanding public awareness about the importance of the global ocean and its resources." (www.whoi.edu/main/vision-mission)

Participants spoke about mobilizing new knowledge within the community. This includes a strong focus on outreach and engagement. Specific suggestions included the following:

- Engage youth and younger generations to help transform society and create future leaders in climate change
- Be a centre where community/industry can come to work with students and researchers on specific projects to address issues related to climate change
- Use social media to engage citizens and communities in the identification and decision making processes
- Host events where industry and researchers come together to discuss challenges and potential solutions
- Provide students with truly unique problem-solving, hands-on experiences and community work-integrated learning to help address specific challenges on a fee for service basis
- Define objectives and specific measurable outcomes for students and provide virtual as well as hands-on learning experiences
- Engage citizens in research projects, such as local data collection (building on the current projects of the UPEI Climate Research Lab), to encourage greater community involvement in climate change initiatives

#### Clear Purpose and Strong Brand

Symposium participants spoke about the need to have a clear focus and unique/differentiated position that leverages the strengths of the University of Prince Edward Island, the UPEI Climate Research Lab, and other synergistic and interdisciplinary expertise. This expertise may include the following:



The following four sectors, which were identified during pre-Symposium consultations, were presented to participants as the potential areas of focus for the proposed Institute.



Symposium Hosted by University of Prince Edward Island, September 20, 2016

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During the Symposium discussions, a clear theme emerged that all identified sectors are important and are interconnected as part of a community focus. These sectors are relevant to local, national and international economies. The discussions led to the recommendation that a focus on coastal community would support the long-term sustainability of the Institute.

#### Leading Institutions have leveraged natural and cultural resources to define a true uniqueness.

IISD (International Institute for Sustainable Development) Experimental Lakes Area is one of the world's most influential freshwater research facilities located at one of the longest <u>continuous freshwater</u> <u>datasets</u> in the world. (Manitoba Canada)

The need to establish a strong brand was a common theme identified during the Symposium, and positive comments were shared about the Parks Canada (and Greenwich) brand and the potential for creating a simple name for the Institute, similar to The Banff Centre.

Leading Institutions have developed a strong brand appeal that is attractive to researchers, community and tourists/visitors.

Smithsonian is the world's largest museum, education, and research complex, consisting of 19 museums and galleries, the National Zoological Park, and nine research facilities.

IISD Experimental Lakes Area is one of the world's most influential freshwater research facilities. Founded in 1968, the Experimental Lakes Area has one of the longest continuous freshwater datasets in the world. The Institute focuses on community outreach, Aboriginal engagement, tours, field courses, and graduate research.

Given these comments, the concept has evolved to include the following:

#### **GREENWICH CLIMATE INSTITUTE**

Taking Action on Climate Change
Responding to Challenges of Coastal Communities

NEW KNOWLEDGE (RESEARCH & DATA)

INNOVATION (INCUBATION)

CONNECTIVITY
(OUTREACH & ENGAGEMENT)

Research, Community, Industry, Aboriginal and Government Partners

The Institute's (proposed) Mission is to a leader by building capacity for evidence-based decisions that inform policy, advance research, and enable lessons learned on local and global scales

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#### **Local and International Scope**

There was agreement on the concept to build capacity in climate change locally to support evidence-informed policy development, research advancement, and application on an international scale. The comment was made to ensure that the Institute addresses local, national and international priorities, which in turn, may also help to attract different funding sources (e.g., government, funds, grants and private sector sponsorships).

Leveraging the existing international network of the UPEI Climate Research Lab and growing the involvement of, and collaboration among, internationally recognized researchers and leading experts was identified as a key to success for the proposed Institute.

The Institute will engage leading research expertise to work on collaborative projects and create new knowledge, approaches, products and solutions. Establishing unique technology, equipment, and expertise that is specific to the Greenwich location was identified as a means to increase the level of international engagement and recognition.

Attracting students from different cultures and backgrounds to support a global higher learning centre was identified as a priority for the Institute. Earning national and international recognition (through world-class research, hosting of national/global conferences, and other activity such as student competitions) was seen as important. Establishing this level of recognition requires building momentum through an early win that is attractive to expert researchers. Broadening the reach through a virtual presence and social media, including to engage youth, was also identified.

#### **Collaborative Community**

Participants identified the Institute as a welcoming environment with lots of open space for networking and collaborative working areas. The architectural design of the building would be part of the brand. An investment is needed in infrastructure, equipment and technology that is unique to the Institute and that will be attractive to researchers, industry and community.

The comment was also made to include displays showcasing the impact of climate change on farming, fisheries, and community culture and heritage. Establishing a virtual community was also identified as a potential direction for the Institute.

#### **Truly Unique Experiences**

Symposium participants spoke about the need to clearly communicate and demonstrate the value of the Institute to its diverse audiences – researchers and leading experts, community, industry, and tourists.

Comments were made about providing experiences to community, students, tourists, and visitors to help influence their future behaviours. They spoke about providing authentic, life-enriching visitor experiences, and leveraging the experience and skills of the leading tourism operators in Prince Edward Island and Atlantic Canada (including Experience PEI). Participants commented on the strong linkage that exists between the proposed Institute and provincial (and national) priorities to grow coastal tourism experiences and Aboriginal tourism and sustainable



development. Other tourism offerings identified include summer camps (similar to those offered by the Atlantic Veterinary College), a science discovery centre, or a museum.

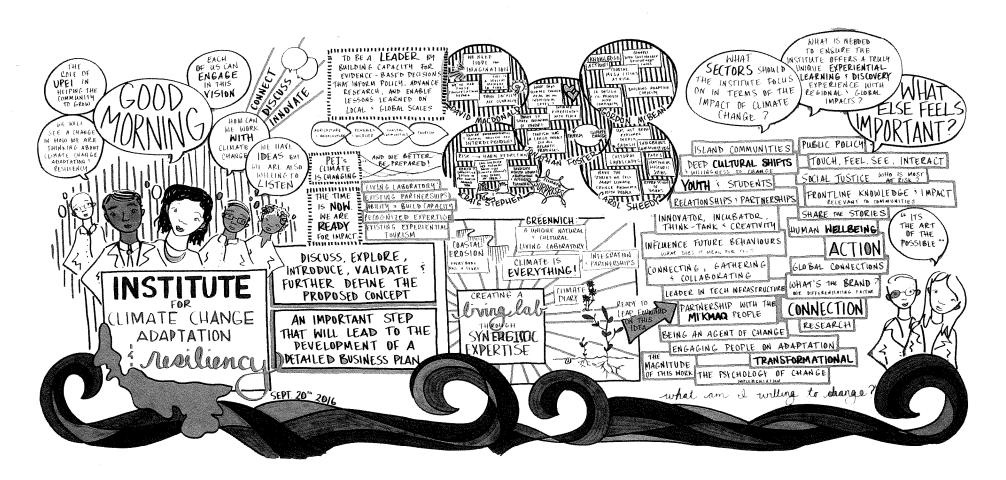
### Leading Institutions have been formed based on a strong partnership between university/research/education and national parks.

Schoodic Education and Research Centre of Acadia National Park (SERC) supports scientific research of importance to the Park, provides professional development for teachers, and educates students to become a new generation of environmental stewards.

Gros Morne Institute for Sustainable Tourism (GMIST) advances the quality and success of Atlantic Canadian tourism operators through an array of training programs to be developed and offered at the Institute. The objective is to enhance the quality and sustainability of outdoor/nature-based experiences afforded throughout Atlantic Canada, by providing developmental training programs respecting: sustainable tourism practices, experiential tourism services and eco-adventure tourism. The Institute is located in beautiful Gros Morne National Park – Rocky Harbour, Newfoundland and Labrador.

#### Conclusion

The University of Prince Edward Island was very pleased with the response rate to participate in the Symposium as well as with the level of engagement and enthusiasm of participants during the Symposium. The discussions and concluding key recommendations provided during the Symposium reinforced the strong potential for UPEI to create a unique approach to climate change in Greenwich, Prince Edward Island. The following page provides a visual overview of the discussions throughout the one-day symposium.



#### 3. UPEI RESPONSE

After careful consideration and reflection on the Symposium discussion, the University of Prince Edward Island saw an opportunity to build a true knowledge cluster and living lab in Greenwich. This would involve, in addition to the focus on the research institute and attraction of visitors, a stronger emphasis on students who will help to create this centre of excellence in St. Peters Area, Prince Edward Island.

UPEI envisions the establishment of The UPEI Greenwich School of Climate, a hands-on experiential learning program for students to engage with industry and community, as the anchor of this knowledge cluster. The proposed School will be located within the existing facilities operated by Prince Edward Island National Park at Greenwich.

While the concept of the UPEI Greenwich School of Climate will be further defined, the preliminary details suggest that the School will:

- Offer globally relevant higher learning, with both a Bachelor of Science (BSc) and a Bachelor of Arts (BA) degree that offers a major in Climate Change
- Provide highly interdisciplinary degrees designed to educate students on the complexity of climate change with emphasis on developing tomorrow's leaders in climate change science and policy
- Include two years of core studies at UPEI in Charlottetown, followed by two years of senior courses and work-integrated-learning at the UPEI Greenwich Campus (involving Parks Canada, Environment and Climate Change Canada, and other government departments and agencies with student placements)
- Be selective in student enrollment, including high standards and strong international recruitment
- Be led by a globally recognized climate change scientist in partnership with an individual with parliamentary and legislative expertise, and a team of outstanding faculty members with internationally recognized expertise in frontline research areas such as GIS (geographic information system)
- Deliver programs in collaboration with The Smithsonian Institute (building on an existing memorandum of agreement with the Institute, which includes the world's largest museum, education and research complex, consisting of 19 museums and galleries, the National Zoological Park and nine research facilities) and other global partners
- Be a unique 'living lab' of climate change intended to promote a high level of collaboration by providing community, industry and visitors with access to knowledge and by establishing platforms for sharing information, enabling innovation, and connecting researchers (students, faculty and leading experts) with industry and community to address real-world issues

Symposium Hosted by University of Prince Edward Island, September 20, 2016

- Also result in the development of a graduate program in climate change to enable new knowledge acquisitions and the training of tomorrow's science leaders
- Engage researchers and scientists from Parks Canada, Environment and Climate Change Canada, and other organizations to participate as sessional lectures, guest speakers, and occasional project researchers at the UPEI Greenwich Campus

The new School will use the existing infrastructure in Greenwich, which will require renovations and upgrades to convert the existing facility into labs and classrooms and a capital investment in terms of wireless infrastructure, lab equipment and materials, and other. The establishment of a new student residence is proposed while a home stay option will also be provided to students who wish to reside with local families for a further integrative community learning/living experience.

The UPEI Greenwich School of Climate will work closely with the proposed Institute, which has a mission to be a leader in building capacity for evidence-based decisions that inform policy, advance research, and enable lessons learned on local and global scales.

#### **Knowledge Cluster Centre** Institute Leading UPEI Research Greenwich Public School of Policy Climate Strong Local, Undergraduate National, Graduate International Collaboration New Student Residence, Home Stay and Community Economic Impact Greenwich, St. Peters Area

**UPEI Greenwich Campus** 

The UPEI Greenwich Campus will have a positive socio-economic impact on St. Peters Area. This will include, but not be limited to, the following:

- Rural revitalization with the injection of students and researchers as a place to learn, live,
   and work
- Greater diversity within the community, with students, visitors, and researchers from around the world connecting with local residents
- Enhanced experiential tourism development with an increase in visitation to the region, supporting tourism priorities for Prince Edward Island; the unique tourism offering will generate national and international exposure through the Parks Canada affiliation
- Direct and indirect economic spin offs with students, faculty and visiting researchers living and spending more dollars in the community and, as a result, increased tourism
- Increased visitation with the electric bus proposed to be designed by the students and faculty of UPEI School of Sustainable Design Engineering

Through the UPEI Greenwich School of Climate, faculty, students and researchers will work more closely with industry to explore challenges and identify solutions. There will be a greater opportunity for knowledge generation and spin offs to include new clean technologies and

Symposium Hosted by University of Prince Edward Island, September 20, 2016

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other entrepreneurial ideas. The UPEI Greenwich School of Climate will work closely with the students and faculty of the UPEI School of Sustainable Design Engineering and the UPEI School of Mathematics and Computational Sciences on industry engagements and community projects.

#### 4. NEXT STEPS

The next steps are as follows:

- Further define the above identified concept
- Conduct two best practices site visits to leading institutions in North America
- Identify equipment and infrastructure needs and associated capital costs
- Develop a detailed business plan including operational budget

#### APPENDIX A: ORIGINAL PROPOSED CONCEPT

The following concept was presented to the participants of the Symposium.

## Institute for Climate Change Adaptation and Resilience A Unique Opportunity for Canada

Building capacity in climate change adaptation and resilience in Prince Edward Island so that we can apply this new knowledge locally, regionally, nationally, and internationally

With a focus on the following proposed sectors:



#### **Important Considerations**

- Exemplary **experiential learning and discovery** for students, faculty, community and visitors
- Advancing research and new knowledge to inform public policy and support community adaptation and resilience to environmental challenges; sustainable communities; and natural and coastal ecosystems
- **Innovative industry partnerships** in key economic sectors (e.g., agriculture, aquaculture, fisheries, tourism, information and technology, renewable energy)
- In-depth research and knowledge transfer in **support of entrepreneurial opportunities** (e.g., clean technology start-ups) and transformation to a Clean Growth Economy
- Strengthening of PEI's **experiential tourism offering** and economic spin offs in the community
- Expansion of **national and international** networks, alliances and reputation
- Truly unique opportunity for Canada

#### The Proposed Ultimate Goal

To be a leader in climate change adaptation and resilience by building capacity for evidencebased decisions that inform policy, advance research, and enable lessons learned on local and global scales

#### **Strategic Priorities (Proposed)**

- Engage in collaboration and knowledge transfer to inform public policy and support sustainable communities, adaptable sectors, and entrepreneurial developments (an overall transition to a clean growth economy)
- Deliver truly unique experiential learning and discovery opportunities for students, faculty, visiting public, communities and tourists that attract people from around the world
- Provide government and industry with graduates and the next generation researchers who have the skill sets and experiences that will help communities be sustainable (economically, health and well-being, and culturally)

The proposed Institute builds on the strategic priorities of the University of Prince Edward Island, which are as follows:

- Outstanding experiential learning opportunities that translate theory into practice for students, faculty, community and visitors
- Discovery and research excellence, leveraging national and international networks
- An intimate learning environment, as the gateway to exceptional educational opportunities to **support vibrant communities**, working with local, regional, national and international partners
- Expanding our presence in the community

The proposed Institute will leverage the synergistic expertise of interdisciplinary areas within the University:



The proposed Institute will leverage the strengths of the University, UPEI's internationally recognized climate research expertise (through the UPEI Climate Research Lab and international networks), the UPEI/Parks Canada strategic partnership, and the one of its kind natural and cultural living laboratory at Greenwich, Prince Edward Island National Park in St. Peters Bay Area.

Parks Canada has a complementary mandate:

- Protect and present Canada's natural and cultural heritage
- Integrate traditional indigenous knowledge
- Habitats, wildlife and ecosystem protection.
- Species at risk protection and recovery
- Experiential learning and discovery for visitors
- National network
- · International reputation

This concept is not new to UPEI and many keys to success are already in place for the proposed Institute. **Ready for Impact**"

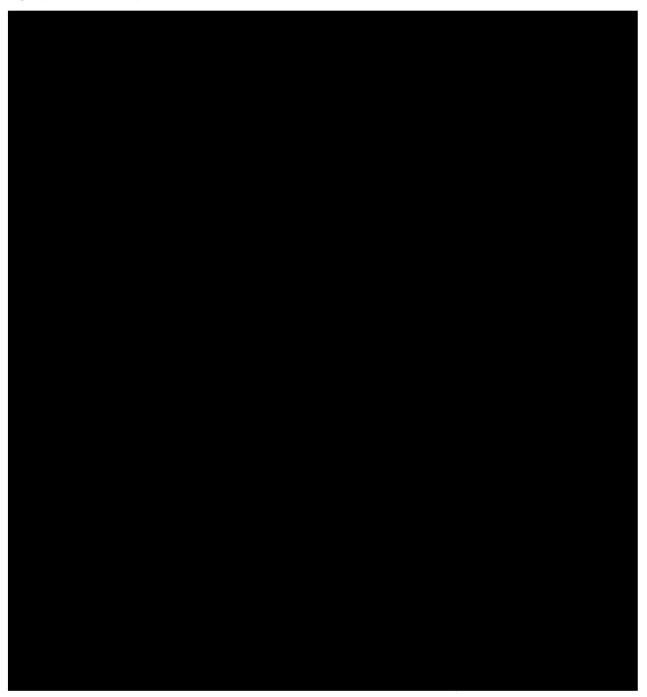
- Demonstrated cluster leadership and internationally **recognized** expertise in climate change
- **Existing** natural and cultural unique setting of the Greenwich peninsula, a 'living laboratory'
- **Proven ability** to build capacity in climate change adaptation that can be applied to other regions
- Strengthening of an **existing** experiential tourism product offering with international appeal
- Building capacity through an existing UPEI/Parks Canada strategic partnership

#### **APPENDIX B: PARTICIPANT LIST**

#### **Symposium Host**

Dr. Alaa Abd-El-Aziz, President and Vice-Chancellor, University of Prince Edward Island

Symposium Participants (in alphabetical order)





#### **Guest Speakers**



Guests who were not able to attend the Symposium but provided a Letter of Support

Dr. Francisco Dallmeier, Senior Conservation Biologist, Smithsonian Institution (Appendix D)

#### APPENDIX C: ENVIRONMENTAL SCAN

#### 1.0 Introduction

As part of the initial research for this engagement, MRSB conducted an environmental scan of existing Canadian and International climate change centres and coastal ecosystem research centres. The descriptions below include most of the Centres in Canada but the global examples are not exhaustive. Many of the Centres are affiliated with a university and conduct research in collaboration with researchers at other universities, within government, other research institutes, etc. Some are virtual networks with research conducted at various locations depending on the nature of the research, some have dedicated field stations. One example which might be interesting in terms of Greenwich is the Schoodic Education and Research Centre (SERC) of Acadia National Park in Maine (page 20). It has grown to be a huge facility but the model could still be applicable. It is located in a National Park and works closely with the Park, it was established with government grants and charitable donations and is now managed by a non-profit organization.

#### 2.0 Centres in Canada

#### BRITISH COLUMBIA

#### Pacific Institute for Climate Solutions (PCIS)

http://pics.uvic.ca/ - Hosted and led by the University of Victoria in BC in collaboration with BC's three other research intensive universities — Simon Fraser, UBC and UNBC. An external advisory board comprising representatives from the public, private and non-profit sectors contributes advice to the Institute.

PICS is governed by an executive committee appointed by the University of Victoria, a program committee comprising researchers from the four partner universities and representatives from the provincial Climate Action Secretariat (CAS) and the Canadian Centre for Climate Modelling and Analysis of Environment Canada

## Canadian Centre for Climate Modelling and Analysis <a href="https://www.ec.gc.ca/ccmac-cccma/-">https://www.ec.gc.ca/ccmac-cccma/-</a> Located at the University of Victoria in BC.

It is a section of the Climate Research division of Environment Canada

# The Society of Ecological and Coastal Research (SEACR) <a href="http://whalelab.geog.uvic.ca/seacr">http://whalelab.geog.uvic.ca/seacr</a>- Their research is focused on the west coast of Vancouver Island and includes a specialty in whales. The whale research lab is located at the University of Victoria. Their field station is on an Island 40 minutes away from Tofino by boat. It provides accommodations for the researchers who go out most days for various data collection work.

A partnership of the Whale Research Lab and SEACR

Hakai Institute https://www.hakai.org/ - It is a scientific research institution with 2 research stations that advances long-term research at remote locations on the coastal margin of British Columbia, Canada. Includes the Coastal Sand Ecosytems group, <a href="http://www.hakai.org/">http://www.hakai.org/</a> research/coastal-sand-ecosystems a team of interested researchers working on various subprojects that explore the biophysical processes within, connections between, and ecological and/or geomorphic responses of sub-tidal (nearshore), inter-tidal (foreshore), and supra-tidal (backshore) components of coastal sand ecosystems. Activities include short-term research and experimentation, and more long-term monitoring of key environmental attributes in these systems.

The Institute is funded in part by the Tula Foundation, a selffunded family foundation

### Vancouver Aquarium Coastal Ocean Research Institute

https://www.vanaqua.org/act/research/coastal-ocean-research-institute - The Vancouver Aquarium Coastal Ocean Research Institute is new and will systematically collect, analyze, and publicly communicate data describing the health of coastal ecosystems on Canada's West Coast. The Institute will operate within the Aquarium's overall non-profit organizational structure, but will function independently through oversight by a separate Management Board. Three current Vancouver Aquarium Research Programs will become part of the Institute.

It is expected the Institute will be funded by a consortium made up of the Aquarium, individual donors, sponsor companies, foundations and others, and that it will operate as an impartial entity entirely independent of its funders

#### **ALBERTA**

#### FRI Research (formerly Foothills Research

institute) http://www.pc.gc.ca/eng/pnnp/ab/jasper/partenaires-partners.aspx#fri - A nonprofit entity which conducts applied research on the cultural, ecological, economic and social values of Alberta's forested landscape. FRI's core study area, located in west-central Alberta and covering about 2.75 million hectares, includes Jasper National Park. Over the years, FRI and Jasper National Park have worked collaboratively on a number of projects. In addition, Park staff sit on several FRI management and steering committees to provide input and project oversight. The shareholders provide stable core funding and in-kind contributions to support overall operations. Other partners provide funding and/or inkind contributions to directly support FRI programs or projects.

FRI's shareholders include various Alberta Government Departments, ConocoPhillips Canada, Parks Canada, Suncor Energy, Talisman Energy, West Fraser Mills, Canfor Corporation and Weyerhauser Co.

#### Municipal Climate Change Action Centre (MCCAC)

http://mccac.ca/ - Provides funding, technical assistance, and education to support Alberta municipalities in addressing climate change.

A partnership of the Government of Alberta, Alberta Association of Municipal Districts and Counties, and Alberta Urban Municipalities Association

#### **ONTARIO**

#### **McMaster Centre for Climate Change**

http://climate.mcmaster.ca/ - Located at McMaster University within the School of Geography and Earth Sciences and Promotes a multi-disciplinary approach and includes faculty, visiting scientists, research scientists, graduate students, interns, volunteers and staff. In addition to research it is involved in community seminars and outreach. Ecosystem Impacts & Adaptations are one of its research areas.

Sponsored by the RBC Foundation and McMaster University

University of Waterloo - The University has an Interdisciplinary Centre on Climate Change <a href="https://uwaterloo.ca/climate-centre/">https://uwaterloo.ca/climate-centre/</a> and in 2015 as a result of a donation from the Intact Financial Corporation in Nov 2015 has established the Intact Centre on Climate Adaptation (ICCA) <a href="http://www.intactcentreclimateadaptation.ca/">http://www.intactcentreclimateadaptation.ca/</a>

Made possible through a donation from INTACT Insurance

#### **Biotron Experimental Climate Change Research**

Centre <a href="http://www.thebiotron.ca/-">http://www.thebiotron.ca/-</a> Located at Western University in London, Ontario. The Biotron is a keystone facility supporting research on biotic and abiotic processes in the environment, and specializes in the simulation of natural environments at a range of scales.

A partnership of Agriculture & Agri-Food Canada, the University of Guelph and the University of Western Ontario

#### QUEBEC

ArticNet <a href="http://www.arcticnet.ulaval.ca/">http://www.arcticnet.ulaval.ca/</a> - Located at Universite Laval, Quebec, funding is to 2018. It represents Canada's largest commitment to date to explore the social, economic and environmental impacts of climate change and modernization in the coastal Canadian Arctic. Over 135 researchers from 29 Canadian universities collaborate with federal, provincial and territorial agencies and departments, Inuit organizations and industry partners on projects.

A Centre of Excellence for Commercialization and Research through the Networks of Centres of Excellence (NEC) Canada Program

Ouranos <a href="https://ouranos.ca/en/-">https://ouranos.ca/en/-</a> Located in Montreal, it is a private non-profit consortium that develops collaborative projects on regional climate change and adaptation. It is currently partnering with

Partners include Province of Quebec, Hydro Quebec, Environment Canada, INRS (Institute of Scientific Research),

Ouranos on a NCE (see ArticNet) proposal for the 2017 funding competition.

UQAM, McGill and Laval University

#### ATLANTIC CANADA

Fisheries and Oceans Canada <a href="http://www.dfo-mpo.gc.ca/science/regions/index-eng.htm#ios-">http://www.dfo-mpo.gc.ca/science/regions/index-eng.htm#ios-</a>
Operates a number of institutes, laboratories and experimental centres across the country, some of which do work related to climate change and coastal ecosystems. There are 2 in the Maritimes – St. Andrew's Biological Station and the Bedford Institute of Oceanography. The Bedford had 5-year funding for an Aquatic Climate Change Adaptation Services Program (ACCASP) from 2011 to 2016. It is not clear from an internet search if funding was renewed.

Operated by the Department of Fisheries and Oceans Canada (DFO)

Not climate change focused but interesting model

#### **Tantramar Wetlands Centre**

http://weted.com/about-us/

A centre of excellence in wetlands education, this indoor and outdoor facility offers students and visitors opportunities to experience the value of wetlands through innovative educational programming. The Centre is adjacent to the campus of Tantramar Regional High School, situated on the edge of the world famous Tantramar Marshes. It includes 15 hectares of fresh-water wetland and a 6,000 sq.ft. indoor facility that provides laboratory space and a fully wired teaching theatre to support the outdoor programs. In 2002, the Jolicure Lakes Field Station inside the Tintamarre National Wildlife Area was added to further extend experiential programming options. A unique feature of the Centre are the student-leaders of Tantramar Regional High School. Known as the Wetheads, this group of young people is very effectively passing on to others what they have learned about the value of wetlands and the need to develop a culture of sustainability.

A partnership of Tantramar Regional High School, Ducks Unlimited Canada, the Canadian Wildlife Service, New Brunswick's Department of Natural Resources, the Town of Sackville and School District 02. Also supported by a number of key public and private sector contributors such as NSERC, MEC, and the Imperial Oil Foundation and key community supporters such as individuals and local businesses

#### 3.0 International Centres

United States of America



### Schoodic Education and Research Centre of Acadia National Park (SERC)

https://www.nps.gov/acad/serc.htm - Located in Maine, the center is designed to expand the role of research within the national parks; allow for more informed, science-based management decision-making; and share research results with researchers, local communities, students, educators, and the public. Within Acadia National Park, SERC staff help facilitate research projects throughout the park and, when the results are available, provide opportunities for learners of all ages to discover the park's natural and cultural resources through this research. The SERC campus includes varied facilities, from meeting and classroom space to lodging and recreational facilities. It is located on the Atlantic coast and offers easy access to coastline habitat, intertidal zones, and spruce/fir forests. The campus was funded by multi-million dollar investments from the USA government and philanthropists. It is managed by the Schoodic Institute, a non-profit organization. Schoodic Institute and Acadia National Park are national leaders in the development of new techniques to involve the public in science and conservation. Schoodic Institute deliberately and tightly intertwines education with research. The Institute's non-profit structure allows more flexibility in creating innovative partnerships. It supports scientific research of importance to the Park, provides professional development for teachers, and educates students to become a new generation of environmental stewards.

One of 20 National Park Service research learning centres in the USA. It is managed by the Schoodic Institute, a nonprofit organization

#### Centre for Climate and Energy Solutions (C2ES)

http://www.c2es.org/about/contact - Located in Arlington, Virginia, it is the successor to the Pew Centre on Global Climate Change. It focuses on advancing strong policy and action to address climate and energy challenges

National Oceanic and Atmospheric Administration (NOAA) National Ocean Service (NOS) - Supports five National Centres for Coastal Ocean Science (NCCOS)

An independent non-partisan non-profit organization

Part of the USA Department of Commerce

Symposium Hosted by University of Prince Edward Island, September 20, 2016

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https://coastalscience.noaa.gov/about/centers/col which work with the NOC Coastal Ocean Science Board to identify coastal management needs and to prioritize efforts. Three of the centers are dedicated research laboratories, another conducts research through analyses of field data, and one funds research with competitive grants. As an example, the Cooperative Oxford Laboratory (COL) is located on Chesapeake Bay, in Oxford, Maryland and administered by NOAA's National Ocean Service. The laboratory is a collaborative research facility with on-site partners, including: NCCOS, NOAA's Chesapeake Bay Office, the Maryland Department of Natural Resources, and the U.S. Coast Guard. This structure benefits NCCOS, and the COL by providing a greater diversity of scientific expertise required to address complex coastal ecosystem issues.

#### The Long Term Ecological Research Network

https://www.lternet.edu/ - There are over 25 sites around the USA. For example, the Georgia site on the central Georgia coast encompasses three adjacent sounds (Altamaha, Doboy, Sapelo) and includes upland (mainland, barrier islands, marsh hammocks), intertidal (fresh, brackish and salt marsh) and submerged (river, estuary, continental shelf) habitats.

Created by the National Science Foundation in the USA (an independent USA government agency responsible for promoting science and engineering research)

## US Geological Survey (USGS) Western Ecological Research Centre (WERC)

http://www.werc.usgs.gov/Project.aspx?ProjectID=222 -, USGS WERC leads a multidisciplinary Coastal Ecosystem Response to Climate Change (CERCC) program. The focus of CERCC is to engage natural resource managers at coastal sites and provide them with "bottom-up" climate change understanding and adaptation at local and regional scales.

A partnership of the University of California, Oregon State University and the USGS (the sole science agency for the Department of the Interior)

#### **SWEDEN**

Stockholm Environment Institute (SEI) <a href="https://www.sei-international.org/">https://www.sei-international.org/</a> It is headquartered in Stockholm, Sweden where it is-co-leader of NORD-STAR (Nordic Centre of Excellence for Strategic Adaptation Research), a 5-year

An international non-profit research

initiative that is a collaboration between organizations (primarily universities and institutes) from all 5 Nordic countries. The other locations include York and Oxford in the UK, Estonia, the USA, Asia and Africa.

organization with seven centres worldwide

#### **CARIBBEAN**

#### **Caribbean Community Climate Change Centre**

http://www.caribbeanclimate.bz - Located in Belize. It is the key node for information on climate change issues and the region's response to managing and adaptation to climate change in the Caribbean.

It is an executing agency for donor-funded climate change projects. (a UN CARICOM Specialized Agency)

#### UK

#### **Cambridge Centre for Climate Change Mitigation**

Research (4CMR) <a href="http://www.4cmr.group.cam.ac.uk/-">http://www.4cmr.group.cam.ac.uk/-</a>
Located at the University of Cambridge and works closely with the Cambridge Centre for Environment, Energy and Natural Resource Governance. Identifies and assesses policies that reduce the risks of climate change while allowing for global economic development through mitigation and adaptation.

A Department of Land Economy research centre

#### **SPAIN**

#### Basque Centre for Climate Change (bc3)

http://www.bc3research.org/ - Its mission is to prepare a highly-qualified team of researchers with the primary objective of achieving excellence in research, training and dissemination relating to the causes and consequences of climate change. A Basque Excellence Research Centre

#### **NETHERLANDS**

#### **Red Cross/Red Crescent Climate Centre**

http://www.climatecentre.org/ - It is a Public Benefit Organization under Netherland's law. The Centre's mission is to help the Red Cross and Red Crescent Movement and its partners reduce the impacts of climate change and extreme-weather events on vulnerable people.

A specialist reference centre of the International Federation of Red Cross and Red Crescent Societies (IFRC)

# APPENDIX D: LETTER OF SUPPORT

Dr. Francisco Dallmeier, Senior Conservation Biologist, Smithsonian Institution



# Smithsonian Conservation Biology Institute

September 12, 2016

Adam Fenech, Ph.D.
Associate Professor, Environmental Studies
Director, Climate Research Lab
University of Prince Edward Island
550 University Avenue, Charlottetown, Prince Edward Island, Canada C1A 4P3

Dear Colleagues,

Thank you for sharing the proposal to establish an international research institute on climate change adaptation and resilience at the Greenwich facility on Prince Edward Island.

This type of institute is exactly what is needed to focus on the ongoing challenges that a changing climate presents. By centering the institute's work on the vulnerability, impacts and adaptation of climate change to wildlife and biodiversity, the institute will become one of the important pieces of international research needed to address these important issues.

I understand that Greenwich is a unique ecosystem of grasslands, forests, wetlands, beaches and coasts all in a tight geographical area that will allow the area to become a "living laboratory" for climate change research on wildlife and biodiversity.

My work at the Smithsonian Institution over the past 30 years has concentrated on research, monitoring and training in the area of biodiversity. I have brought Dr. Fenech into my work since 1995 to assist in capturing the atmospheric and climate aspects to my research. Most recently, as an adjunct professor at George Mason University, Dr. Fenech has taught climate change courses at the Smithsonian Mason School of Conservation at the teaching facility at Front Royal, Virginia, USA.

I look forward to the establishment of this institute, and see continuing my relationship more formally through this institute whereby my work with the Smithsonian Institution will continue and expand into the east coast of Canada.

I look forward to visiting soon.

Sincerely,



Center for Conservation and Sustainability Smithsonian Conservation Biology Institute 1100 Jefferson Drive, Suite 3123 Box 37012 MRC 705 Washington, DC 20013 -- 7012

**202 633-4782** 

# APPENDIX V: ADMISSION REQUIREMENTS, PROGRAM MATRIX AND COURSE DESCRIPTIONS for UPEI BACHELOR OF SCIENCE IN APPLIED CLIMATE CHANGE AND ADAPTATION

(Note: The following information is as presented within MPHEC submission in April 2017. Some minor details may vary as per the normal course of program development and planning.)

# ADMISSION REQUIREMENTS AND STANDARDS SPECIFIC TO THE PROGRAM

#### Introduction

The Bachelor of Science in Applied Climate Change and Adaptation is a 127 semester hour degree program.

#### Overview

The UPEI Bachelor of Science in Applied Climate Change and Adaptation provides students with a strong foundation in climate sciences complemented by courses in climate related policy and cultural impacts of climate change. The program offers strong comprehensive theory-based courses and a high level of experiential and applied learning. Courses are designed to develop well-rounded students who have a high level of climate change science knowledge supported by highly relevant skills needed to utilize climate change related technology. Faculty members teaching within the Bachelor of Science in Applied Climate Change and Adaptation program are focused on providing quality instruction and student growth within a cohort-based learning community. Graduates of the program will emerge ready to pursue various climate change related careers, professional studies, or graduate education.

#### **Applied Climate Change and Adaptation**

This program of study examines "climate change adaptation" which refers to the adjustments that societies or ecosystems make to limit the negative effects of climate change or to take advantage of opportunities provided by a changing climate. Adaptation can range from a farmer planting more drought-resistant crops to a coastal community evaluating how best to protect its infrastructure from rising sea level. Climate change is already impacting societies and ecosystems around the world, and many impacts are expected to increase as global temperatures continue to rise. While reducing greenhouse gas emissions is required to avoid the worst impacts of climate change, a certain amount of global warming is inevitable, due to the long-lasting nature of greenhouse gases already in the atmosphere, and to heat already stored in the oceans. Adapting to the changes that are already underway, and preparing for future climate change, can help reduce the risks societies will face from climate change.

#### Admission

Students will apply directly from high school to the UPEI Bachelor of Science in Applied Climate Change and Adaptation program. Admission will be capped at 40 students, with two of the 40 seats dedicated for Aboriginal students. Students of the program will progress as a cohort. All eligible first year candidates are ranked on their average in Grade 12: academic English, academic Math, academic Chemistry, academic Biology, one other Grade 12 academic subject; minimum overall average of 70% with no individual grade below 65%.

Applicants whose average in Biology, Chemistry, English and Math is 89% and above when final results for first semester grades are obtained will receive an "Early Offer" of admittance. This "Early Offer" process is subject to chance dependent on program capacity. All other applicants will be ranked. The majority of offers will be made by April. Further offers are made in May and July. Applicants deemed as alternates and enrolled in courses are to have all prerequisite courses completed by June 30. Final official transcripts must be received at the Registrar's Office no later than July 15.

In an effort to support a diverse cohort and build a program with global perspectives and global knowledge transfer opportunities, UPEI proposes to admit an equal number of domestic and international students. Consideration will be given to students transferring into the program based on eligibility and enrolment numbers. University transfer students are subject to existing requirements for undergraduate admissions for the Faculty of Science.

# COURSE MATRIX UPEI BACHELOR OF SCIENCE IN APPLIED CLIMATE CHANGE AND ADAPTATION

T	ERM 1 (YEAR 1 – FALL SEMESTER)	SemHr	T	ERM 2 (YEAR 1 – WINTER SEMESTER)	SemHr
ACC 1010	Introduction to PEI's Living Climate Lab	3	ACC 1020	Introduction to Community Climate Program Technologies	3
BIO 1010	Current Issues in Environmental Biology	3	ACC 2030	Indigenous Knowledge in Climate Change and Adaptation	3
ENV 1010	Introduction to Environmental Studies	3	CS 1510	Introduction to Computer Science I	3
MATH 1910	Single Variable Calculus I	4	ÚPEI 1010,	Writing Studies	3
			UPEI 1020,	Engaging Ideas and Cultural Context	
			or UPEI 1030	Engaging University Contexts and Experience	
One of the following electives:		3	One of the f	ollowing electives:	
CHEM 1110	General Chemistry I		ECON 1010	Introductory Economics	
HIST 1010	Canadian History — Pre-Confederation		PHIL 1050	Technology, Values and Science	3
PSYC 1010	Introduction to Psychology I		PHYS 1210	Physics for Life Sciences I	
Т	ERM 3 (YEAR 2 – FALL SEMESTER)	SemHr	T	ERM 4 (YEAR 2 – WINTER SEMESTER)	SemHr
CHEM 2XXX	Environmental Chemistry (note: currently	3	ACC 1030	Surveying Cultural Landscapes in the	3
	being modified for non-Chemistry majors)			Environmental Humanities	
PHIL 2030	Environmental Philosophy	3	BIO 3270	Field Coastal Ecology	3
PHYS 2610	Atmospheric and Ocean Physics	3	ENV 3110	Understanding Climate Change	3
STAT 2210	Introductory Statistics I	3	POLS 2020	The Politics of Climate Change and Adaptation	3
One of the following electives:			One of the following electives:		
			ENV 3210	Natural Hazards	
ENG 2060	Critical Approaches to Texts 1		ENV 3420	Environment and Development	
ENV 2120	Earth Physical Science		ENV 3510	Sustainable Community Planning	
SOC 2660	Science, Culture and Society	3	STAT 2220	Introduction to Statistics II	3
	SUMMEI	R SEMESTI	ER 1 (YEAR 2)		SemHr
ACC 2160	Work Integrated Learning I	Louis on the same	Fill and the fear later of the construction		3
Т	ERM 5 (YEAR 3 – FALL SEMESTER)	SemHr	J	ERM 6 (YEAR 3 – WINTER SEMESTER)	SemHr
ACC 3010	Global Climate Change Vulnerability and Adaptation	3	ACC 3040	Climate Change Statistics in R	3
ACC 3020	Climate Future and Modelling	3	ACC 3060	Visualization of Climate Change	3
ACC 3030	Climate Change Surveillance	3	ACC 3090	Geographic Information Systems for Climate Change	3
ACC 3050	Renewable Energy and Clean	3	ACC 3120	Climate Change Management and Adaptation	3
	Technologies	-		in Canada	
ACC 3100	Climate Change Impacts on Biodiversity	3	ACC 3140	Business Risk Assessment under Climate Change	3
	SUMMEI	R SEMESTI	ER 2 (YEAR 3)	8-	SemHr
ACC 3160	Work Integrated Learning II	110-140-1700-1701-1701-1700-1	•		3
STATE OF STREET	ERM 7 (YEAR 4 – FALL SEMESTER)	SemHr	1	ERM 8 (YEAR 4 – WINTER SEMESTER)	SemHr
ACC 3080	Reducing Greenhouse Gas Emissions	3	ACC 4060	Measuring Your Carbon Footprint through Carbon Accounting and Carbon Trading	3
ACC 4010	Oceans, Coastal Systems and Climate	3	ACC 4070	Climate Extremes	3
ACC 4010	Change	3	ACC 4070	Cimate Extremes	J
ACC 4020	Uncertainty and Probability in Climate Change	3	ACC 4080	Climate Change Impact and Adaptation	3
ACC 4040	Computer Programming to Visualize Climate Change	3	ACC 4110	Climate Change and Human Health	3
					T
ACC 4090	Climate Change and Sustainable Tourism	3	ACC 4120	International Climate Diplomacy	3
«Yawerissas» (Vervia sepecturinos) videos		3 <b>61</b>		International Climate Diplomacy r Semester Hours	60

#### **COURSE DESCRIPTIONS**

#### **Applied Climate Change and Adaptation Courses**

#### ACC 1010 INTRODUCTION TO PEI'S LIVING CLIMATE LAB

Prince Edward Island is often referred to as a "living laboratory" because of its manageable size for research conceptualization, design and execution. This course focuses on how Prince Edward Island is the perfect "living laboratory" for understanding the causes, impacts, and solutions to the challenge of climate change. By visiting unique areas across the Island such as the parabolic sand dunes at the Greenwich site of the PEI National Park; the Acadian forest at MacPhail Woods; the Hillsborough River Heritage Watershed; the coastal dune system at Basin Head featuring unique white sands and a nearby protected marine area; the Wind Energy Institute of Canada at North Cape; the agricultural research at Cavendish Farms; DesRoches Pond at Blooming Point; and the First Nations community of Lennox Island, students will examine how these areas can play a role in understanding the vulnerability, impacts and adaptation to climate change.

PREREQUISITE: None

Three hours a week, field trips

Three semester hours

#### **ACC 1020 INTRODUCTION TO COMMUNITY CLIMATE PROGRAM TECHNOLOGIES**

This course provides an introductory hands-on experience in utilizing innovative technologies to develop solutions to the challenges that communities face under future climate change. Focusing on skills development in drone technology, video game programming, geographic information systems, global positioning systems, mapping, surveillance, and renewable energies, this course examines how innovative technologies can assist in the understanding of the vulnerability, impacts and adaptation to climate change. Students will develop technology skills in personal and social responsibility; planning, critical thinking, reasoning, and creativity; strong communication skills, both for interpersonal and presentation needs; cross-cultural understanding; visualizing and decision making; knowing how and when to use technology; and choosing the most appropriate tool for the task.

PREREQUISITE: None

Three hours a week, field trips

Three semester hours

# ACC 1030 Surveying Cultural Landscapes in the Environmental Humanities

Designed to engage students directly with the island habitat around them, this experiential-based course draws upon a range of humanities-based disciplines as it explores the ways in which human culture has responded to and been shaped by aspects of the natural environment. After an introductory look at the history of the human response to nature, we will focus on modern and contemporary responses from the areas of philosophy and ethics, visual arts, literature, anthropology, architecture, biology, and music. This reading will form the backdrop to our exploration of a range of island settings including Greenwich, MacPhail Woods, Lennox Island, and North Cape, each of which offer specific local instances of how physical and cultural environments shape one another. Grounded in the Environmental Humanities as a prevailing interdisciplinary approach, the course integrates humanities-based understandings of the natural world with direct participation in it.

PREREQUISITE: None

Three hours a week
Three semester hours

#### ACC 2030 INDIGENOUS KNOWLEDGE IN CLIMATE CHANGE AND ADAPTATION

Indigenous knowledge is the local knowledge that is unique to a culture or society. Other names for it include 'local knowledge', 'folk knowledge', 'people's knowledge', 'traditional wisdom' or 'traditional science'. This knowledge is passed from generation to generation, usually by word of mouth and cultural rituals, and has been the basis for agriculture, food preparation, health care, education, conservation and the wide range of other activities that sustain societies in many parts of the world. Archaeologists have found evidence of early Mi'kmaq settlements on Prince Edward Island that date back thousands of years. Indigenous people have a broad knowledge of how to live sustainably. This course brings this knowledge of Canadian Indigenous communities' relationship to the environment as valuable lessons for understanding climate vulnerability, impacts and adaptation. Students will be led by a local First Nations teacher whose valuable insights to implementing efficient uses of our land and spiritual relationships with nature can assist in addressing global sustainability.

PREREQUISITE: None Three hours a week Three semester hours

# **ACC 2160 WORK INTEGRATED LEARNING (I)**

This course is a summer work-integrated-learning (WIL) opportunity facilitated through either a flagship partnership agreement with Parks Canada, or a number of government and industrial organizations that will provide real-world experiences to students that will assist them in securing employment upon graduation.

Eight weeks work experience
Three semester credits

inice semester credits

# ACS 3010 GLOBAL CLIMATE CHANGE VULNERABILITY AND ADAPTATION

This course examines the impacts of changing climate on natural and human systems and focuses on the capacity of societies to adjust to, plan for, and cope with changing climate and environmental conditions. Students will be given the opportunity to understand the physical basis of the natural greenhouse effect, and the human contribution to it; how astronomical forces influence the Earth's climate and their cycles; physical and chemical properties of the atmosphere that influence climate including the role of the cryosphere, oceans, land processes, etc; greenhouse gases (their global warming potential, chemical makeup, and sources and quantifying the human contributions globally, nationally, provincially); and paleological indicators of climate including ice cores, tree rings, sediment cores, etc.; how these indicators are collected; and what they tell us about past temperature changes.

PREREQUISITE: ENV 2120 and ENV 3110

Three hours a week
Three semester hours

# **ACC 3020 CLIMATE FUTURES AND MODELLING**

This course will provide the knowledge and tools necessary to acquire regional scenarios of future climate change including a rigorous validation exercise of climate model output against historical observations to

help provide confidence that certain models are able to capture observed climatology, while helping to identify those models which appear less suited to particular locations; as well as a multi-model (ensemble) approach to produce climate change projections that is by far the most currently accepted method of considering climate change projections versus the acceptance of a single, or limited number of available models. The course will examine greenhouse gas emissions scenarios and their driving of climate models (Global Climate Models and Regional Climate Models); the Intergovernmental Panel on Climate Change's Special Report on Emission Scenarios (SRES) and the new approaches to future scenarios known as representative concentration pathways (RCPs); and validating climate models against observations. The class structure will vary between lectures, discussions, hands-on exercises, assignments, and a final project. The course is designed to provide the knowledge and theory behind practical tools for understanding how the future climate may change.

PREREQUISITE: ENV 3110

3 hours a week, alternating classroom and laboratory

Three semester hours

## **ACC 3030 CLIMATE CHANGE SURVEILLENCE**

This course is designed to provide an informed understanding of how the climate is surveyed and monitored. Students will be given the opportunity to understand how the components of climate are monitored instrumentally including temperature, precipitation in its many forms, wind, solar radiation, atmospheric pressure, humidity, etc.; the history of written climate archives, how observations were collected and digitized, then input several pages into climate dataset; databases, how they are organized, software available to assist, how climate records are organized; plan and execute setting up a climate station that reports to a UPEI climate database; online climate records, where they are available, how they are downloaded, how they are organized, quality control climate records; and an introduction on how to analyze climate trends, and calculate climate indices.

PREREQUISITE: ACC 1020

Three hours lecture, three hours laboratory a week

Three semester hours

#### ACC 3040 CLIMATE CHANGE STATISTICS IN R

R is a programming language and software environment for statistical computing and graphics supported by the RFoundation for Statistical Computing. The R language is widely used among climatologists for data analysis and provides a wide variety of statistical (linear and nonlinear modelling, classical statistical tests, time-series analysis, classification, clustering, etc.) and graphical techniques, and is highly extensible. This course is designed to provide an introduction to computer programming in R software and how to use R for effective data analysis. You will learn how to install and configure software necessary for a statistical programming environment and describe generic programming language concepts as they are implemented in a high-level statistical language. The course covers practical issues in statistical computing which includes programming in R, reading data into R, accessing R packages, writing R functions, debugging, profiling R code, and organizing and commenting R code. Topics in statistical climate data analysis will provide working examples.

PREREQUISITE: MATH 1910, CS 1510 and STAT 2210 Three hours a week on-line, three hours laboratory

Three semester hours

#### **ACC 3050 RENEWABLE ENERGY AND CLEAN TECHNOLOGIES**

This course provides an in-depth introduction to sustainability theory and green technology, renewable energy in a sustainable future, and why renewable energy is necessary for the future. The course begins with an examination of the historical context for the physical, environmental, technological, economic and political aspects of traditional energy systems and energy transitions. Students will then be introduced to different types of renewable energy technology such as: wind energy, solar, hydro-electric, geothermal energy, wave energy, tidal energy, ocean thermal, fuel cells, heat pump systems, and high voltage DC energy transport. The implementation of these technologies is also studied to understand how they can work as a replacement for conventional technologies.

This course includes a field trip to the Wind Energy Institute of Canada in North Cape, Prince Edward Island.

PREREQUISITE: ACC 1910 and PHYS 2610

Three hours a week
Three semester hours

#### **ACC 3060 VISUALIZATION OF CLIMATE CHANGE**

An emerging approach to enhancing participation and awareness building at the local level is the use of 3D landscape visualisation to depict past and future community scenarios. Various forms of imagery including GIS-based tools, 3D modeling and photo-manipulation have been explored to investigate landscape change and management. These highlight the potential for visualization to influence an individuals' perceptions of landscapes, floods, and a changing environment, which in turn may influence cognitive and affective (or emotive) understanding and influence individual and collective behaviour to respond appropriately to risks. This course will examine forms of climate change visualization employed in climate change impact assessment, through integrating the analytical (including predictive) capabilities of GIS-based software with the emotionally-rich and intuitive media of photo-realistic software; representing recognizable places and local information in a realistic manner (as opposed to more abstract representation) that increases personal relevance; presenting both past and alternative futures (allowing for choice) to assist with decision making; and using computer visualization techniques that allow for modification and user-feedback in a participatory manner for refinement and analysis.

PREREQUISITE: CS 1510

Three hours lecture, three hours laboratory per week

Three semester hours

# ACC 3080 REDUCING GREENHOUSE GAS EMISSIONS

Much like the glass of a greenhouse, gases in our atmosphere sustain life on Earth by trapping the sun's heat. These gases allow the sun's rays to pass through and warm the Earth, but prevent this warmth from escaping our atmosphere into space. Without naturally occurring, heat-trapping gases—mainly water vapour, carbon dioxide and methane—Earth would be too cold to sustain life as we know it. The danger lies in the rapid increase of carbon dioxide and other greenhouse gases that intensify this natural greenhouse effect. For thousands of years, the global carbon supply was essentially stable as natural processes removed as much carbon as they released. Modern human activity—burning fossil fuels, deforestation, and intensive agriculture—has added huge quantities of carbon dioxide and other greenhouse gases. This course will examine the human sources of greenhouse gas emissions, by nation

and by activity, to determine the best approaches for meeting a "safe" or "below dangerous level" of atmospheric concentrations of these gases. Using the Harvey mathematical model, students will comprehensively and critically assess what it would take to stabilize atmospheric CO2 concentration at no greater than 450ppmv without replacing existing nuclear power capacity as it retires and without resorting to carbon capture and storage (CCS).

PREREQUISITE: ENV 3110 and ACC 3020

Three hours a week
Three semester hours

#### ACC 3090 GEOGRAPHIC INFORMATION SYSTEMS FOR CLIMATE CHANGE

Geographic Information Systems (GIS) are used in a wide variety of planning, facilities management, resource management, business, and applied research applications. The common thread in this diverse range of applications is the need to store, manipulate, and analyze spatial data. Since spatial factors are central to almost all issues related to planning and geographic inquiry, it is important to develop a sound grasp of GIS principles and the fundamental skills required to apply it in practice. This course provides an introduction to digital mapping and spatial analysis using GIS. Students learn how to create their own maps, how to use GIS software to analyse geographic problems, and learn techniques that can be applied to understanding climate change. The lectures discuss underlying theory and how it is implemented in GIS software. The lab sessions allow students to gain hands-on experience with GIS software as applied to the climate change challenge.

PREREQUISITE: None

Three hours on-line and three hours laboratory a week

Three semester hours

#### **ACC 3100 CLIMATE CHANGE IMPACTS ON BIODIVERSITY**

The changing climate is a significant driver of biodiversity and is already altering many ecosystems. It is necessary to prevent and mitigate these changes to preserve the biodiversity and ecological integrity of the region. This course will review the baseline data and systematic observation networks to assess biodiversity conservation and policy responses to global climate change; integrate our knowledge of likely future changes on biodiversity from a changing climate; examine predictive models and decision support tools to guide the design and selection of adaptation strategies from local to regional scales; and establish a framework for future collaborative research on climate change and biodiversity. A field component of the course will establish a biodiversity-monitoring plot using methods developed by The Smithsonian Institution's measuring and assessing biodiversity protocols.

PREREQUISITE: BIO 3270

Three hours a week with three hours field/laboratory work

Three semester hours

#### ACC 3120 CLIMATE CHANGE AND ADAPTATION MANAGEMENT IN CANADA

This course introduces approaches to environmental management in Canada focused on climate change aspects. Specifically, the course will examine various environmental laws and regulations such as the Canadian Environmental Protection Acts, and other related environmental legislation which helps individuals and companies protect from possible litigation while at the same time helps preserve the environment; will examine how to apply federal and provincial Environmental Assessment legislation to proposed projects such as the Planning Act, by highlighting strategies and nuances of the legislation; and will examine the principles and fundamentals of completing a variety of environmental audits for industry, institutions, and commercial enterprises. An understanding of the Federal Adaptation Policy Framework which guides domestic action by the Government of Canada to address adaptation to the impacts of climate variability and change will be gained through a review of various government agencies.

Assignments will allow students to develop skills in conducting environmental management systems audits and evaluation of the mainstreaming of adaptation into government programming.

PREREQUISITE: POLS 2020

Three hours a week
Three semester hours

#### ACC 3140 BUSINESS RISK ASSESSMENT UNDER CLIMATE CHANGE

Climate change is affecting all businesses and all industries through a changing physical environment and damaging extreme weather events; impending greenhouse gas emission mitigation regulations and legislation; and a need for adaptation measures to address these changing physical and regulatory environments. Business and Climate Change is an interdisciplinary, intensive course designed to provide an informed understanding of business in the era of climate change by examining the implementation of carbon taxes across Canada and comparing with other carbon pricing systems such as the greenhouse gas cap and trade approach. Specialized activities will focus around the business sector of each student's choice focusing on the important role of understanding climate change for business risk assessment.

PREREQUISITE: ENV 3110

Three hours a week
Three semester hours

#### **ACC 3160 WORK INTEGRATED LEARNING (II)**

This course is Year 2 of a summer work-integrated-learning (WIL) opportunity facilitated through either a flagship partnership agreement with Parks Canada, or a number of government and industrial organizations that will provide real world experiences to students that will assist them in securing employment upon graduation.

Eight weeks work experience

Three semester credits

## ACC 4010 OCEANS, COASTAL SYSTEMS AND CLIMATE CHANGE

This course will focus on understanding the impact of global climate change on the oceans, including warming, ocean acidification, subsurface oxygen depletion, and changes to the marine ecosystem. Implications of these changes for global fisheries and aquaculture will be discussed. Core concepts about how the formation of ocean basins and their influence on climate govern the development of coasts will be introduced. Shoreline classification and coastal sensitivity will be examined through the development of

littoral zones as a key step in being able to assess the effects of coastal risks and hazards (coastal flooding, coastal erosion, and damage to coastal ecosystems) or shorelines. All of these hazards will be examined through the combined actions of sea level rise, tides, storm surge, and wave action. Students will develop a process to assess the vulnerability of the local fishery (eg. lobster fishery) to these climate impacts and develop concrete options for adaptation.

PREREQUISITE: ENV 2120
Three hours a week
Three semester hours

#### ACC 4020 UNCERTAINTY AND PROBABILITY IN CLIMATE CHANGE

Uncertainty exists in our daily lives as well as in every discipline in science, engineering, and technology. Probability theory is a mathematical framework that allows us to describe and analyze random phenomena (events or experiments whose outcomes we cannot predict with certainty) in the world around us. This course is designed to introduce concepts of probability and uncertainty used in the climate change discipline. The course will provide basic concepts such as random experiments, probability axioms, conditional probability, law of total probability, Bayes' rule, and counting methods; single and multiple random variables (discrete, continuous, and mixed), as well as moment-generating functions, characteristics functions, random vectors, and inequalities. It will be demonstrated how these concepts are applied and communicated in climate change science assessments.

PREREQUISITE: STAT 2210 and ACC 3060

Three hours on-line, three hours laboratory per week

Three semester hours

## ACC 4040 COMPUTER PROGRAMMING TO VISUALIZE CLIMATE CHANGE

Unity3D is computer-gaming software with a powerful cross-platform 3D engine and a user-friendly development environment. Easy enough for the beginner and powerful enough for the expert, Unity is used by everyone who wants to easily create 3D games and applications for mobile, desktop, the web, and consoles. This course provides an introduction to the application of Unity gaming software to climate change visualization. An emerging approach to enhancing participation and awareness building at the local level is the use of 3D landscape visualisation to depict past and future community scenarios. Following an introduction on the basics and essentials of the Unity gaming software—Using the Unity Interface; Essential Unity Concepts such as Game Objects and Components, Prefabs — Concept and Usage, Tags, and Layers; Extending the Unity Editor— students will use the imagery data acquired by the drone in ACC 3040 to develop a 3D interactive sea-level rise tool.

PREREQUISITE: CS 1510, ACC 3040, ACC 3050 and ACC 3060

Three on-line hours, three hours laboratory per week

Three semester hours

# ACC 4060 MEASURING YOUR CARBON FOOTPRINT THROUGH CARBON ACCOUNTING AND CARBON TRADING

Global greenhouse gas emissions are now at a record high, and the world's scientific community agrees that continued unabated release of greenhouse gases will have catastrophic consequences. Many efforts to curb greenhouse gas emissions, both public and private, have been underway for decades, yet it is now clear that collectively these efforts are failing. Critical to any attempt to mitigate greenhouse gas emissions is a clear, accurate understanding of the sources and levels of greenhouse gas emissions. This course will address all facets of greenhouse gas emissions accounting and reporting, and will provide students with tangible skills needed to direct such efforts in the future. Students in this course will gain hands-on experience designing and executing greenhouse gas emissions inventories, employing all necessary skills including the identification of analysis boundaries, acquisition of data, calculation of emissions levels, and reporting of results. As a final exercise, this course will calculate the carbon footprint of individual businesses, companies or public organizations.

PREREQUISITE: ACC 3140
Three hours a week
Three semester hours

#### **ACC 4070 CLIMATE EXTREMES**

Weather and climate extremes are an inherent part of climate. There is overwhelming evidence that the climate and its extremes are changing. As extremes affect every aspect of our society, decision- and policymakers, and stakeholders are increasingly asking for reliable predictions of extremes on time scales from days to seasons and centuries. This course will examine the quality and coverage of the observational data that are used to monitor and understand climate extremes; the factors and mechanisms that determine the location, intensity, and frequency of various climate extremes; and an in-depth examination of Atlantic Region droughts, floods, heavy precipitation events, heat waves, cold spells, tropical and extratropical storms, coastal sea level surges, and ocean waves. Temporal considerations will be examined of the near-term (from a season to a year) to mitigate risks to society and ecosystems, and in the longer term (from a decade to centuries) for effective adaptation planning. Students will learn to read and understand specialized tools such as precipitation intensity, duration, and frequency (IDF) curves used by engineers in the design, operation, and maintenance of municipal water management infrastructure as well as other infrastructure.

PREREQUISITE: ENV 3210 and ENV 3030

Three hours a week
Three semester hours

#### **ACC 4080 CLIMATE CHANGE IMPACTS AND ADAPTATION**

This course follows the steps in conducting a climate change impact assessment as detailed in the Guidelines of the Intergovernmental Panel on Climate Change (IPCC), the leading international authority on climate change. These include how to plan a climate change impact assessment; how to select a method for conducting a climate change impact assessment; how to conduct a climate change impact assessment rapidly; how to use skills developed in ACC 3020 and ACC 3030 to acquire regional scenarios of future climate change and bring these information and tools together into a climate change impact assessment. Typologies of adaptation and possible adaptation strategies for major economic sectors, limits to adaptation, maladaptation, and approaches to adaptation planning will also be covered. The final

course assignment will conduct a rapid assessment of the impacts of climate change and potential adaptation strategies for the PEI economy and ecology, designated for a local business, industry, or government agency.

PREREQUISITE: ACC 3020 and ACC 3030

Three hours a week
Three semester hours

#### ACC 4090 CLIMATE CHANGE AND SUSTAINABLE TOURISM

For tourism, climate change is not a remote event, but a phenomenon that already affects the sector and certain destinations in particular, mountain regions and coastal destinations among others. At the same time, the tourism sector is contributing to greenhouse gas emissions (GHG), especially through the transport of tourists. This course will provide the information and tools necessary to: develop an awareness of the environmental, socio-cultural and economic impacts of tourism; acquire knowledge of the possible measures to redress the negative impacts of tourism; develop an understanding and appreciation of environmental sustainability in tourism; develop knowledge and understanding of the concept of ecotourism; and incorporate the principles of sustainable tourism into developing and managing tourism destinations and products.

PREREQUISITE: ACC 3140 Three hours a week Three semester hours

# ACC 4110 CLIMATE CHANGE AND HUMAN HEALTH

This course explores how human health is shaped by the circumstances in which people are born, grow up, live, work, and age, and how these in turn connect to a wider set of environmental, social, cultural, economic, and political forces. Students will investigate the impact of systems put in place to deal with illness, and examine how understandings of human health are shaped by the cultures we live in and by competing claims about health and disease. Connections are made between climate change and its influence on vector borne diseases; mental health; the effects of extreme heat/cold on chronic health; prenatal health; and food security. Special consideration of First Nations approaches and understanding to human health and community well-being will also be examined.

PREREQUISITE: ACC 2030, recommended SOC 2660 and PHIL 1050

Three hours a week
Three semester hours

#### **ACC 4120 INTERNATIONAL CLIMATE DIPLOMACY**

Canada is signatory to a large number of international environmental agreements that govern environmental management in Canada. These include agreements in the areas of wildlife (Birds, Whaling, International Trade in Endangered Species, Biodiversity), atmosphere (Acid Rain, Climate Change, Stratospheric Ozone Depletion, Toxic Chemicals) and water (Wetlands, Law of the Sea). This course provides an historical and analytical view for understanding international environmental relations, identifies the main actors and their roles, and presents the core theories and facts about international environmental governance. The course examines how governments, international bodies, scientists, activists and corporations address global environmental problems. Specific international environmental agreements and their implications for Canadian environmental management will be examined including

the Vienna Convention for the Protection of the Ozone Layer, the Convention on Long Range Transport of Atmospheric Pollutants, the UN Framework Convention on Climate Change and the Biological Diversity Convention.

As a class exercise, students will take on the role of countries in the United Nations and negotiate a climate agreement.

PREREQUISITE: POLS 2020

Three hours a week
Three semester hours

# Additional Program Courses Delivered by other Departments BIOLOGY

#### **BIO 1010 CURRENT ISSUES IN ENVIRONMENTAL BIOLOGY**

This course considers environmental problems from a biological perspective. Human ecology, populations, pollution, resource use and other topics are discussed critically.

PREREQUISITES: None

Lectures and field trips to the equivalent of three to six hours a week

#### **BIO 3270 FIELD COASTAL ECOLOGY**

Field coastal ecology is an intensive field-oriented course designed to provide knowledge and experience surveying and monitoring the organisms and habitats best represented in coastal Prince Edward Island. Using a hands-on approach, students are expected to learn and apply the sampling protocols that are most useful to each type of habitat. Although the course will have a broad theoretical component (early daily lectures on community types and sampling design), its main focus will be on activities to be developed in the field and subsequently in the laboratory. These activities include sampling, processing, and identification or organisms collected in the most typical benthic habitats of the Island.

PREREQUISITES: BIO 1010 for students registered in Bachelor of Science in Applied Climate Studies and Adaptation.

Three hours lecture, three hours laboratory/field trips per week
Three semester hours

#### **CHEMISTRY**

#### **CHEM 1110 GENERAL CHEMISTRY I**

This course emphasizes the fundamentals of chemistry. Topics include: atoms, molecules and ions; stoichiometry; mass relations; gases and their behaviour; electronic structure and the periodic table; covalent bonding and molecular geometry; and thermochemistry. The laboratory associated with this course stresses stoichiometry, qualitative analysis, atomic spectroscopy and thermochemistry. PREREQUISITE: Grade XII Chemistry, Chemistry 001 or the permission of the Chair in special cases Three lecture hours a week; one three-hour laboratory period or tutorial a week

## **CHEM 2XXX ENVIRONMENTAL CHEMISTRY**

Note: An Environmental Chemistry course for non-Chemistry majors is currently being developed to address interest expressed by students in other programs over the past few years to have the ability to enrol in this course. The modification will support students in the proposed program as well as other students. Prerequisites will be modified to appropriately reflect content and learning outcomes. Currently Environmental Chemistry deals with major topics of concern in environmental chemistry. Emphasis is

placed on the chemistry involved, as well as assessment of the relative hazards and corrective methods available to provide abatement. Topics covered include: atmospheric free radical chemistry, the greenhouse effect, stratospheric ozone, tropospheric chemistry and photochemical smog, the chemistry of natural water systems, acid rain, indoor air quality, sewage and waste management, chlorinated organic compounds, and heavy metals in the environment.

PREREQUISITE: COURSE AND PREREQUISITES CURRENTLY BEING DEVELOPED

Three lecture hours a week TO BE CONFIRMED

COMPUTER SCIENCE

#### CS 1510 INTRODUCTION TO COMPUTER SCIENCE I

This course is designed to introduce the fundamentals of Computer Science and prepare students for further studies in this or related fields. Emphasis is on problem solving and software development in a high level object-oriented language such as Java. Topics include computer fundamentals; the programming process; language syntax and semantics; simple data types, classes, methods, expressions, control structures, input/output, arrays, and graphical user interfaces.

PREREQUISITE: Grade XII academic Mathematics.

Three lecture hours and 1.5 hour of laboratory session per week

NOTE: CS 151 and Engineering 131 cannot be double credited.

#### **ECONOMICS**

#### **ECON 1010 INTRODUCTORY MICROECONOMICS**

This course provides an introduction to the economic analysis of consumer and producer behaviour. Of particular concern is the role of the market in the allocation of resources and the distribution of income, and how these outcomes are affected by imperfections in the market system and by government policy.

PREREQUISITE: None Three hours a week

Three semester hours

#### **ENGLISH**

#### **ENG 2060 CRITICAL APPROACHES TO TEXTS I**

This course approaches literary and cultural texts through a number of critical lenses including reader response, Marxism, feminism, historicism, psychoanalysis, and deconstruction. The course is designed to introduce students to a variety of critical approaches to the interpretation of literary and cultural texts. Three hours a week

#### **ENVIRONMENTAL STUDIES**

#### **ENV 1010 INTRODUCTION TO ENVIRONMENTAL STUDIES**

This course introduces students to a multidisciplinary and interdisciplinary approach to the study of environmental issues; and emphasizes the interrelationships among the various physical, biological, and human systems. It examines major contemporary environmental issues, such as global warming and land use, and focuses on how these issues are understood and addressed within the natural sciences, social sciences, and humanities.

PREREQUISITE: None

Three hours a week (some field trips may be required)

Three semester hours

#### **ENV 2120 EARTH PHYSICAL ENVIRONMENT**

This course will introduce students to the basic 'building blocks' of Earth's physical characteristics, providing a foundation on which to develop more specialist knowledge in their understanding of Environmental Studies. It will examine the geologic and geomorphic cycles, including processes of weathering, erosion, transportation and deposition, and investigate how these create fluvial, glacial, and coastal landforms and impacts on human activity. It also aims to address atmospheric processes and the links between global climate zones and world ecosystems.

PREREQUISITE: ENV 1010 or permission of the instructor

Three hours a week
Three semester hours

#### **ENV 3110 UNDERSTANDING CLIMATE CHANGE**

This course introduces students to the science of climate change. Students explore its social and political implications, and examine its impact on daily life by reviewing current scientific data as it relates to vulnerabilities of particular regions. Topics include methods, strategies, and technologies that address climate change, using case studies of adaptive and mitigative programs in North America, with a special emphasis on Canada's climate action plan.

PREREQUISITE: ENV 1010 or 2030

Three hours a week
Three semester hours

#### **ENV 3210 NATURAL HAZARDS**

This course provides an introduction to the causes of a variety of natural hazards (tectonic, e.g. earthquakes, tsunamis, and volcanic activity; meteorological, e.g. hurricanes and flooding; and mass movement, e.g. landslides, mudslides, and avalanches) as well as their impact on human activities and the strategies available to predict and manage such events.

PREREQUISITE: ENV 1010 or ENV 2030 or permission of the instructor

Three hours a week
Three semester hours

#### **ENV 3420 ENVIRONMENT AND DEVELOPMENT**

This course focuses on environment and development issues in an international, particularly a developing country, context. Issues related to trade, biodiversity conservation, agriculture, climate change, wealth, poverty, population, and gender will be explored.

PREREQUISITE: ENV 101 or permission of the instructor

Three semester hours of credit

#### **ENV 3510 SUSTAINABLE COMMUNITY PLANNING**

An overview of how planning tools and practice shape the form of communities, including: (1) Key issues and principles of sustainability at a community scale; as well as related planning approaches; (2) Sustainable community planning approaches and tools for identifying and achieving quality of life, and (3) The components and process of developing an integrated sustainable community plan. Students will learn how to assess community capital, identify and recruit key stakeholders and develop, implement, monitor and evaluate a community plan.

PREREQUISITE: ENV 101 or ENV 203 or permission of the instructor

Three semester hours of credit

#### **HISTORY**

#### HIST 1010 CANADIAN HISTORY—PRE-CONFEDERATION

This course surveys topics of historical importance in Canadian history up to and including the attainment of Confederation. The emphasis is on the interaction between political events and change in the economy and society. Tutorials examine various historical interpretations of the Canadian experience.

Lecture: Three hours a week Tutorial: One hour a week

# MATHEMATICS, STATISTICS AND COMPUTER SCIENCE CS 1510 INTRODUCTION TO COMPUTER SCIENCE I

This course is the first of a two-course sequence designed to introduce the fundamentals of Computer Science and prepare students for further studies in this or related fields. Emphasis is on problem solving and software development in a high level object-oriented language such as Java. Topics include computer fundamentals; the programming process; language syntax and semantics; simple data types, classes, methods, expressions, control structures, input/output, arrays, and graphical user interfaces.

PREREQUISITE: Grade XII academic Mathematics.

Three lecture hours and 1.5 hour of laboratory session per week

NOTE: CS 151 and Engineering 131 cannot be double credited.

# MATH 1910 SINGLE VARIABLE CALCULUS I

This course is an introduction to differential and integral calculus of functions of a single variable. The course is intended primarily for majors in the Mathematical and Computational Sciences, Engineering and the Physical Sciences, as well as those planning to continue with further Mathematics courses. The concepts of limits, continuity and derivatives are introduced and explored numerically, graphically and analytically. The tools of differential calculus are applied to problems in: related rates; velocity and acceleration; extrema of functions; optimization; curve sketching; and indeterminate forms. The concepts of definite and indefinite integrals are introduced, and the relation between the two integrals is discovered

via the Fundamental Theorem of Calculus.

PREREQUISITE: Grade XII academic Mathematics and a passing grade on the Assessment Test.

Four lecture hours per week Semester hours of credit: 4

#### STAT 2210 INTRODUCTORY STATISTICS 1

The main objective of this course is to introduce the basic concepts of descriptive statistics, statistical inference, and the use of statistical software such as MINITAB to students in any discipline. More time is spent on statistical inference than on descriptive statistics. Topics include frequency distributions, descriptive statistics, rules of probability, discrete and continuous probability distributions, random sampling and sampling distributions, confidence intervals, one- and two-tail tests of hypotheses, and correlation and linear regression.

PREREQUISITE: Grade XII academic Mathematics

Three lecture hours per week

Three semester hours

**NOTE:** Credit will not be allowed for Statistics 2210 if a student has received credit for any of the following courses: Business 2510, Education 4810, Psychology 2710 and Sociology 3320.

# STAT 2220 INTRODUCTORY STATISTICS II

The course builds upon the knowledge developed in Introductory Statistics I and introduces students to statistical techniques commonly used in research. Topics include linear regression and multiple linear regression, residual analysis, simple ANOVA models, categorical data analysis, simple sampling models, and common distributions (including binomial, Poisson, and exponential).

PREREQUISITE: Stat 2210
Three lecture hours per week

#### **PHILOSOPHY**

#### PHIL 1050 TECHNOLOGY, VALUES, AND SCIENCE

This course explores the connections among technology, human values, and science that are manifested in society, economic systems, and relationships between humans and the natural world. The study of the connections reveal the vast impact that science and technology have on our understanding of the world and our views on the future as well as on personal identity and the human body. It exposes students to critical examination of objectivity in scientific research, progress in technology and science, scientific risk assessment, and genetic engineering. No particular background in science is assumed in this course.

Lectures: Three hours a week

#### PHIL 2030 ENVIRONMENTAL PHILOSOPHY

This course explores the contours of contemporary environmental thought and the diversity of approaches to environmental ethics. Emphasis is on critically understanding historical, cultural and ideological diversity while exploring the moral contours of human-nature interactions, both locally and globally. Topics may include the question of values in nature; environmental movements; aboriginal and postcolonial perspectives; social justice as related to the environment; spirituality; sustainability and consumption; the privatization of environmental morality; inhabiting vs. residing; place, art and environmental education. PREREQUISITE: None

Three lecture hours a week
Three semester hours

#### **PHYSICS**

#### PHYS 1210 PHYSICS FOR LIFE SCIENCES I

This course is intended for life science and health science students. Students are introduced to the fundamental concepts of physics and some of their applications to biological systems. Topics include vectors, kinematics, force, energy and power, torque, linear and angular momentum, and fluid mechanics. PREREQUISITE: Proficiency in High School algebra, trigonometry and graphing is expected. It is required that Mathematics 112 or Mathematics 191 be taken at least concurrently. High school physics is strongly recommended.

Three hours lecture, three hours laboratory or tutorial per week

#### PHYS 2610 ATMOSPHERIC AND OCEAN PHYSICS

Note: Course proposed by Department of Physics to replace current PHYS 2610 Energy, Environment and the Economy based on desire to update the course and offer it to a broader cross-section of students who are non-Physics majors.

The course is designed to provide students with an understanding of the foundational physics principles 1) that give rise to the complex processes and interactions that occur in the atmosphere and oceans of the Earth and 2) that are fundamental to the design and operation of the instrumentation used to measure and monitor climate properties. The course will explore fluid dynamics needed to describe atmospheric and ocean circulation, and associated interactions with the cryosphere; thermodynamics, heat transfer, cosmic and solar radiation and the global energy balance; the physics of atmospheric aerosols and clouds and their role in the climate system; instrumentation and measurement physics with a focus on temperature, humidity, pressure and solar radiation; computational physics and modeling of climate properties and processes.

PREREQUISITE: Permission of the department

Three hours lecture (seminars and/or field visits to be arranged)

#### POLITICAL SCIENCE

#### POL 2020 THE POLITICS OF CLIMATE CHANGE AND ADAPTATION

This course surveys the political context of climate change: how climate change is understood and responded to by governments, political parties, political movements (both environmental activists and climate change deniers), and the media. Specific topics also covered in this course include international treaties and regulatory agencies dealing with climate change issues, such as greenhouse gas emissions, ocean warming, drought and flood management, coastal erosion, and climate-change refugees.

PREREQUISITE: None

Three lecture hours a week

Three semester hours

#### **PSYCHOLOGY**

#### PSYC 1010 INTRODUCTION TO PSYCHOLOGY I

A general introductory survey of theory and research on basic psychological processes: research methodology in psychology, biological basis of behaviour, sensation and perception, learning and motivation, memory and cognition.

PREREQUISITE: None Three hours a week

## SOCIOLOGY/ANTHROPOLOGY

SOC 2660 SCIENCE, CULTURE, AND SOCIETY

This course considers three centuries of modern Western science as it has been imagined and practised in Europe, initially, and eventually the rest of the globe. It especially considers the relationships between contemporary science and its socio-cultural contexts; discrepancies between the ideal of Science and its actual practice; the role of gender, class, and race in the production of scientific knowledge; and some important debates within the field of science studies, such as the place of subjectivity and objectivity, or whether science is universal or dependent on time, place and field of study.

PREREQUISITE: Anthropology 105 or Sociology 101; or letter of permission from instructor.

Three hours a week
Three semester hours

#### UPEI MANDATORY FIRST YEAR COURSE (ONE OF THE FOLLOWING THREE REQUIRED)

UPEI 1010 WRITING STUDIES (Cross Listed with ENGLISH 1010 Writing Studies)

This course offers an introduction to university writing and rhetoric, aimed at the development of clear, critical thinking and an effective prose style.

Three lecture hours per week

Three semester hours

## **UPEI 1020 ENGAGING IDEAS AND CULTURAL CONTEXTS**

This course is for students who want to explore a broad array of issues and 'big' questions that are related to human culture and the natural world from a local to a global perspective. This course emphasizes and cultivates critical inquiry, writing and reading skills through an analysis of texts/topics of contemporary significance.

Three lecture hours per week

Three semester hours

# **UPEI 1030 ENGAGING UNIVERSITY CONTEXTS AND EXPERIENCE**

This is a course for students who seek a well-supported, strongly integrated adjustment to life and learning within the university environment. This course is designed to create a cohesive learning community for students, connecting them to each other and to their instructors in the classroom and beyond. The curriculum focuses on helping students to develop the attitudes, study strategies, and broad communication and research skills they will need to thrive throughout their post-secondary experience.

Three lecture hours per week

Three semester hours

#### **PROGRAM DELIVERY**

UPEI has proposed the program as a cohort-based model with an intake of forty high-achieving students per year. Efforts will be made to recruit a globally diverse cohort consisting of PEI students, Canadian, and international students to promote program knowledge transfer and networks across various geographic locations and communities.

Years 1 and 2 of the Bachelor of Science in Applied Climate Change and Adaptation will be delivered through lectures, coursework and labs at the UPEI campus in Charlottetown, PEI. Years 3 and 4 of the Bachelor program will be delivered through small group projects, labs, community learning, field courses—the latter of which will be delivered in partnership with The Smithsonian Institution, a UPEI learning and research partner—at UPEI's satellite campus, the UPEI Greenwich School of Climate Change and Adaptation, being established in the St. Peters area of PEI.

Two WIL experiences for students will take place over eight-week periods during the summers between years 2 and 3, and years 3 and 4. WIL experiences are paid and for credit within the 127- credit Applied degree. They may take place locally, regionally, nationally and, potentially, internationally. The model and delivery of UPEI's Bachelor of Science in Applied Climate Change and Adaptation—which integrates a highly multidisciplinary perspective and strong experiential learning approach—makes the program unique to the region and country.

In development new climate related programming, UPEI has consulted with globally-recognized experts Dr. Francisco Dallmeier, Senior Conservation Biologist, Smithsonian Institution, and Dr. Gordon McBean, Professor and Research Chair, Institute for Catastrophic Loss Reduction and Departments of Geography and Political Science, University of Western Ontario for input and best practices advice.

# Scharf, Kelsey (INFC)

From:

Syed, Fariya (INFC)

Sent:

May 24, 2019 3:02 PM

To: Cc: Olson, Spencer (INFC)
Chung-How, Catherine (INFC); Scharf, Kelsey (INFC)

Subject:

RE: UPEI

Agreed and happy to jointly pass the message. Let's have a call with him Monday. Can you please pick a time that works on the calendar?

From: Olson, Spencer (INFC) Sent: May 24, 2019 3:00 PM

To: Syed, Fariya (INFC) <fariya.syed@canada.ca>

Cc: Chung-How, Catherine (INFC) <catherine.chung-how@canada.ca>; Scharf, Kelsey (INFC) <kelsey.scharf@canada.ca>

Subject: RE: UPEI

Fariya,

A big thank you to Kelsey for the quick turnaround on this initial review for completeness. It appears that the funding % and stacking rules have been respected in this latest iteration.

Spencer Olson 613-948-9148

From: Scharf, Kelsey (INFC) Sent: May 24, 2019 2:34 PM

To: Olson, Spencer (INFC) < spencer.olson@canada.ca>

Cc: Chung-How, Catherine (INFC) < catherine.chung-how@canada.ca>

Subject: RE: UPEI

Spencer,

This is the exact same business case that was submitted before but with updated funding amounts.

ATIA - 21(1)(a) ATIA - 21(1)(b)

Kelsey

From: Olson, Spencer (INFC) Sent: May 24, 2019 2:13 PM

To: Scharf, Kelsey (INFC) < kelsey.scharf@canada.ca>

Subject: UPEI

Kelsey,

We just received an updated business case from Prince Edward Island for the UPEI- Climate Change and Adaptation project. All documents are found here:

P:\Prince Edward Island\NBCF-PTIC\NRP\52336 - UPEI - Canadian Centre for Climate Change and Adaptation\Resubmission of project - May2019

Can you please review the business case for:

- a) Completeness; and
- b) Eligibility

Spencer Olson 613-948-9148

# Scharf, Kelsey (INFC)

From:

Alex Dalziel < jadalziel@gov.pe.ca>

Sent:

May 27, 2019 1:02 PM

To:

Olson, Spencer (INFC); Paul Godfrey

Cc:

Syed, Fariya (INFC); Scharf, Kelsey (INFC)

Subject:

Re: UPEI CCAC

**Attachments:** 

INFC Follow up July 10.docx

Hi Spencer,

We've forwarded these questions/comments along to UPEI. I just went back through our files here and noticed that several of them were asked, and subsequently answered back in July 2018. See attached for INFC's questions/UPEI's answers.

I don't recall having received any feedback on these answers and perhaps there was none given, considering the primary issues around Federal contribution and ineligible costs that were present at the time. There's also the fact that several more iterations of the business case were submitted since then, so the information may not have been carried forward with the revised business cases. We can discuss further on the call, if need be.

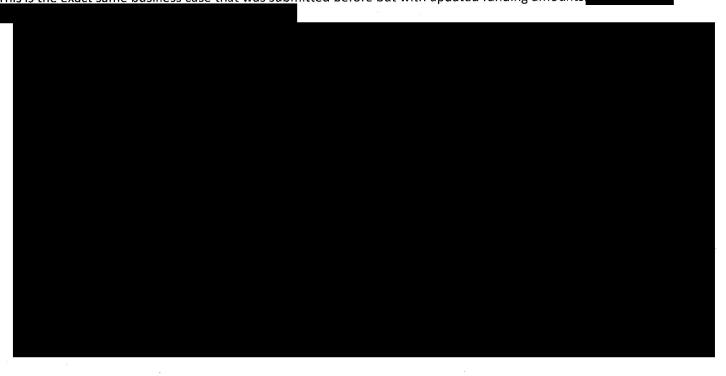
Thanks,

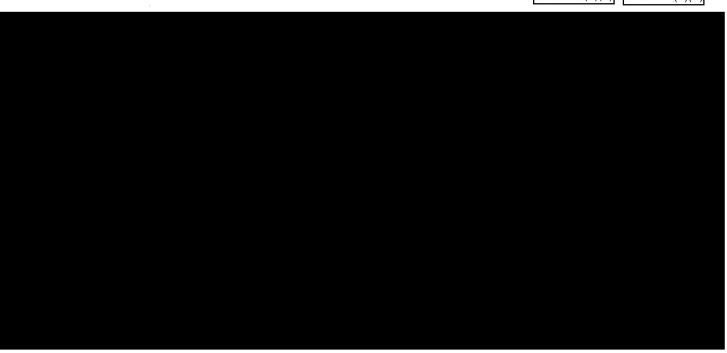
Alex

>>> "Olson, Spencer (INFC)" <spencer.olson@canada.ca> 5/27/2019 8:44 AM >>> Paul,

We can discuss further this afternoon but in our initial review of the business case we noted that:

This is the exact same business case that was submitted before but with updated funding amounts





Spencer Olson 613-948-9148

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Page(s) 433 to 438

are withheld

pursuant to paragraph

13(1)(c), 20(1)(b), 20(1)(c) & 20(1)(d)

of the Access to Information Act

\*\*\*\*

La/les page(s) 433 à 438

Font l'objet d'une exception totale conformément aux dispositions de paragraphe 13(1)(c), 20(1)(b), 20(1)(c) & 20(1)(d) de la loi sur l'accès à l'information

ATIA - 14

ATIA - 21(1)(b)

ATIA - 21(1)(a)

# Olson, Spencer (INFC)

From:

Olson, Spencer (INFC)

Sent: To: May 28, 2019 8:35 AM Syed, Fariya (INFC)

Subject:

Approval under SCF

NRP and SCF fall under the same Terms and Conditions (NBCF).

The Terms and Conditions were amended to align NRP and SCF more closely. These two programs have identical categories, eligible costs and eligible recipients. Cost sharing for this type of project is 1/3 under both programs.



Spencer Olson 613-948-9148

# Olson, Spencer (INFC)

From:

Olson, Spencer (INFC)

Sent:

May 28, 2019 8:59 AM

То:

Scharf, Kelsey (INFC)

Subject:

FW: UPEI CCAC

Spencer Olson 613-948-9148

From: Alex Dalziel [mailto:jadalziel@gov.pe.ca]

Sent: May 27, 2019 3:07 PM

To: Olson, Spencer (INFC) <spencer.olson@canada.ca>

Cc: Paul Godfrey < JPGODFREY@gov.pe.ca>

Subject: Re: UPEI CCAC

Hi Spencer,

We had a couple quick questions come out of the discussion we just had with UPEI:



We advised them on the short timeline and they said they would press to get something back to us by the end of day tomorrow, all in the NRP business case format. We'll be in touch if we receive any more questions from UPEI. Thanks,

# Alex

>>> Alex Dalziel 5/27/2019 2:01 PM >>> Hi Spencer,

We've forwarded these questions/comments along to UPEI. I just went back through our files here and noticed that several of them were asked, and subsequently answered back in July 2018. See attached for INFC's questions/UPEI's answers.

I don't recall having received any feedback on these answers and perhaps there was none given, considering the primary issues around Federal contribution and ineligible costs that were present at the time. There's also the fact that several more iterations of the business case were submitted since then, so the information may not have been carried forward with the revised business cases. We can discuss further on the call, if need be.

Thanks,

Alex

>>> "Olson, Spencer (INFC)" <<u>spencer.olson@canada.ca</u>> 5/27/2019 8:44 AM >>> Paul,

We can discuss further this afternoon but in our initial review of the business case we noted that:

This is the exact same business case that was submitted before but with updated funding amounts.



Spencer Olson 613-948-9148

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# ATIA - 21(1)(a) ATIA - 21(1)(b)

# Olson, Spencer (INFC)

From:

Olson, Spencer (INFC)

Sent:

May 30, 2019 7:36 AM

To:

Syed, Fariya (INFC)

Subject:

RE: MINO Q: UPEI Proposal

I am working with PEI to prepare the SCF submission.

we are

expecting to receive this project under NBCF-PTIC-SCF either today or Friday.

Spencer Olson 613-948-9148

From: Syed, Fariya (INFC) Sent: May 29, 2019 6:09 PM

To: Olson, Spencer (INFC) < spencer.olson@canada.ca>

Subject: Fwd: MINO Q: UPEI Proposal

Pipeline is tomorrow.

Thanks

Begin forwarded message:

From: "Sausins, Katrine (INFC)" < katrine.sausins@canada.ca>

Date: May 29, 2019 at 6:05:17 PM EDT

To: "Syed, Fariya (INFC)" < fariya.syed@canada.ca>

Cc: "Sierra, Monica Alejandra (INFC)" <monicaalejandra.sierra@canada.ca>, "McKenzie, Vicki (INFC)"

< <u>vicki.mckenzie@canada.ca</u>>, INFC.O PO.ADMO.Users/Utilisateurs.OP.BSMA O.INFC

<INFC.PO.ADMO.Users-Utilisateurs.OP.BSMA.INFC@canada.ca>

Subject: Fwd: MINO Q: UPEI Proposal

Good afternoon!
Please see below a request from MinO.
Kind thanks,
Katrine

Sent from my iPhone

Begin forwarded message:

From: "Chan, Jeanna (INFC)" < jeanna.chan@canada.ca>

Date: May 29, 2019 at 4:22:07 PM GMT-4

To: INFC.O PO.ADMO.Users/Utilisateurs.OP.BSMA O.INFC < INFC.PO.ADMO.Users-

Utilisateurs.OP.BSMA.INFC@canada.ca>

Cc: INFC.F DM Office / Bureau du SM F.INFC < infc.dmoffice-

bureaudusm.infc@canada.ca>

**Subject: MINO Q: UPEI Proposal** 

Hi POB,

MINO is inquiring into whether the department has received a new submission from PEO regarding UPEI. Can you confirm?

A response by 4 pm May 31 would be appreciated.

Thanks! Jeanna

# Olson, Spencer (INFC)

From:

Alex Dalziel < jadalziel@gov.pe.ca>

Sent:

May 30, 2019 8:57 AM

To:

Olson, Spencer (INFC)

Cc:

Darlene Rhodenizer; Paul Godfrey

Subject:

Re: PTIC-SCF - UPEI Project Description - DRAFT

**Attachments:** 

NBCF SCF PEI \_UPEI CCCA Project\_May 29 2019.xlsx

Hi Spencer,

See attached for SCF project submission spreadsheet with info on the UPEI Canadian Centre for Climate Change and Adaptation project. Let us know if you spot anything that needs revising. We should be able to get this printed off, signed and sent back sometime this morning.

Thanks,

Alex

>>> Alex Dalziel 5/30/2019 8:44 AM >>> Good Morning Spencer,

Alex

>>> "Olson, Spencer (INFC)" <spencer.olson@canada.ca> 5/29/2019 4:21 PM >>>

Sent from my iPhone

On May 29, 2019, at 3:07 PM, Alex Dalziel < jadalziel@gov.pe.ca > wrote:

Hi Spencer,

We are prepping the SCF submission form for the UPEI project and would like to get your take on the project description we're including. See project description below:

Project Description

The University of Prince Edward Island is proposing to construct a 45,000 square foot research facility in St. Peter's, PEI, which will be equipped with state of the art leading edge technology. The facility will enable applied research in the field of climate change via a highly collaborative approach involving undergraduate and graduate students, expert faculty and visiting researchers working with community, industry and government.

The University will offer the Bachelor of Applied Science in Climate Change & Adaptation for the first two years of the facility's operation, and expand to include a Master of Science in Climate Change & Adaptation in year three.

Please advise if you have any questions, comments or recommendations.

Thanks,
Alex

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de vous en servir, et vous devriez le supprimer complètement de votre système informatique.

#### SMALL COMMUNITIES FUND - PROJECT INFORMATION FORM

Tombstone Information (6 items)					Project Location Information (1 item)		ntal Assessment a consultation (3 Iter		Financial Information (7 items)					Progress Information (2 items)					
Project (I	Project Title	Project Description	Project Category	Project Sub- Category	Ultimate Recipie	Ultimate nt Recipient Typ	e Project Address	Is any part of the project located on federal lands?		Is the project subject to an environmental assessment?			Contributions	dentify the Con		Eligible Recipient Cost (Eligible costs)		Forecasted Construction Start Date	Forecasted Construction End Date
2019-SCF 037	- Canadian Centre for Climate Change and Adapation	The University of Prince Edward Island is proposing to construct a 45,000 square foot research facility in St. Peter's, PEI.  The facility will enable applied research in the field of climate change via a highly collaborative approach involving undergraduate and graduate students, expert faculty and visiting researchers working with community, industry and government.	Innovation	Post-secondary research and development laboratories and centres, and related teaching facilities	University of Prince Edward Island	Post- Secondary Institution	St. Peter's, Prince Edward Island	No	Yes	No	14,600,000	4,866,667			1,866,667	4,866,666	0	2019-07-01	2021-08-30
Total	•										14,600,000	4,866,667	0	4,	,866,667	4,866,666	0		

- I, Darren Chaisson, Deputy Minister with the Province of Prince Edward Island , declare as follows:
- 1. That the information in this Project Information Form is accurate and valid based on the representations made by the Ultimate Recipient
- 2. And, that Projects submitted in the Project Information Form are deemed to be eligible and viable.

Dated, this 30th day of May 2019

Signature Darren Chaisson, Deputy Minister

From:	
-------	--

Olson, Spencer (INFC)

Sent:

May 30, 2019 9:01 AM

To:

Alex Dalziel

Cc:

Darlene Rhodenizer; Paul Godfrey; Scharf, Kelsey (INFC)

Subject:

RE: PTIC-SCF - UPEI Project Description - DRAFT

Looks good

Spencer Olson 613-948-9148

From: Alex Dalziel [mailto:jadalziel@gov.pe.ca]

Sent: May 30, 2019 8:57 AM

To: Olson, Spencer (INFC) <spencer.olson@canada.ca>

Cc: Darlene Rhodenizer < DLRHODENIZER@gov.pe.ca>; Paul Godfrey < JPGODFREY@gov.pe.ca>

Subject: Re: PTIC-SCF - UPEI Project Description - DRAFT

Hi Spencer,

See attached for SCF project submission spreadsheet with info on the UPEI Canadian Centre for Climate Change and Adaptation project. Let us know if you spot anything that needs revising. We should be able to get this printed off, signed and sent back sometime this morning.

Thanks,

Alex

>>> Alex Dalziel 5/30/2019 8:44 AM >>> Good Morning Spencer,

Alex

>>> "Olson, Spencer (INFC)" <<u>spencer.olson@canada.ca</u>> 5/29/2019 4:21 PM >>>

On May 29, 2019, at 3:07 PM, Alex Dalziel < jadalziel@gov.pe.ca > wrote:

Hi Spencer,

We are prepping the SCF submission form for the UPEI project and would like to get your take on the project description we're including. See project description below:

## **Project Description**

The University of Prince Edward Island is proposing to construct a 45,000 square foot research facility in St. Peter's, PEI, which will be equipped with state of the art leading edge technology. The facility will enable applied research in the field of climate change via a highly collaborative approach involving undergraduate and graduate students, expert faculty and visiting researchers working with community, industry and government.

The University will offer the Bachelor of Applied Science in Climate Change & Adaptation for the first two years of the facility's operation, and expand to include a Master of Science in Climate Change & Adaptation in year three.

Dioaco	advica	if wou	have a	nv a	uloctions	comments	or	recommendations.
riease	auvise	n you	Have al	ну ч	juestions,	COMMENTS	OI.	recommendations.

T	har	ιks,
---	-----	------

Alex

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From:

Sent:	May 30, 2019 11:25 AM		•	
To:	Scharf, Kelsey (INFC)			
Subject:	RE: NBCF-PTIC-SCF Proj	ect Submission		
Attachments:	Re: PTIC-SCF - UPEI Proj		Γ .	
, teta emilients.	110.11110 001 0121110	, cee 2 coonparent 210 a	•	
Please start preparing approval of	documentation.			
	1			
Spencer Olson				
613-948-9148				
From: Alex Dalziel [mailto:jadalz	iel@gov.pe.ca]			
Sent: May 30, 2019 11:13 AM				
To: Olson, Spencer (INFC) <spen< td=""><td>cer.olson@canada.ca&gt;</td><td></td><td></td><td></td></spen<>	cer.olson@canada.ca>			
Cc: Darlene Rhodenizer < DLRHO	DENIZER.GOVMOBPO2.G	GOVMAIN@assembly.pe	e.ca>; Scharf, Kelse	ey (INFC)
<kelsey.scharf@canada.ca>; Pau</kelsey.scharf@canada.ca>				
Subject: NBCF-PTIC-SCF Project S	Submission			
			•	
Hi Spencer,	•			
Please see attached for project in				ian Centre for
Climate Change and Adaptation	Project. If you have any fu	urther questions please	let us know.	
Thanks,				
Alex				
·				•
		•		
Statement of Confidentiality				
This massage (including attachm	ants) may contain confide	antial or privileged info	rmation intended fo	or a specific
This message (including attachm individual or organization. If you	<u>-</u>			
are not the intended recipient, yo				
should promptly delete this ema			copy, print or rely	on this email, and
should promptly defete this ema	n nom your chine compu	acci system.		
Déclaration de confidentialité				
2 State of the Confidentiant				
Le présent message (y compris le	es annexes) peut contenir	des renseignements co	onfidentiels à linten	tion d'une personne

Olson, Spencer (INFC)

ou d'un organisme en particulier. Si vous avez reçu la présente communication par erreur, veuillez en informer

l'expéditeur immédiatement. Si vous n'êtes pas le destinata distribuer, de copier ou d'imprimer ce courriel ou encore de	•	_
de votre système informatique.		•
	•	

From: Sent: To: Subject: Attachments:	Trottier-Abbott, Catherine (INFC) May 30, 2019 12:36 PM Freiheit, Heidi (INFC); Scharf, Kelsey (INFC) FW: PTIC-SCF - UPEI Project Description - DRAFT NBCF SCF PEI _UPEI CCCA Project_May 29 2019.xlsx
Thanks Kelsey, Heidi manages SC	F projects for all regions so I'm forwarding this to her.
Kate	
From: Scharf, Kelsey (INFC) Sent: May 30, 2019 12:22 PM To: Trottier-Abbott, Catherine (IN Subject: FW: PTIC-SCF - UPEI Pro	NFC) <catherine.trottier-abbott@canada.ca> ject Description - DRAFT</catherine.trottier-abbott@canada.ca>
Hi Kate!	
We received the following SCF prat your earliest convenience?:)	roject today. We need to get it to PRP as soon as possible. Anyway I can get language
Thanks!	
Kelsey	
From: Alex Dalziel [mailto:jadalzie] Sent: May 30, 2019 8:57 AM To: Olson, Spencer (INFC) < spencer Cc: Darlene Rhodenizer < DLRHOI Subject: Re: PTIC-SCF - UPEI Project	er.olson@canada.ca> DENIZER@gov.pe.ca>; Paul Godfrey < <u>JPGODFREY@gov.pe.ca</u> >
Hi Spencer,	
	nission spreadsheet with info on the UPEI Canadian Centre for Climate Change and f you spot anything that needs revising. We should be able to get this printed off, his morning.
Thanks,	
Alex	
>>> Alex Dalziel 5/30/2019 8:44	AM >>>

The University of Prince Edward Island is proposing to construct a 45,000 square foot research facility in St. Peter's, PEI, which will be equipped with state of the art leading edge technology. The facility will enable applied research in the field of climate change via a highly collaborative approach involving undergraduate and graduate students, expert faculty and visiting researchers working with community, industry and government.

The University will offer the Bachelor of Applied Science in Climate Change & Adaptation for the first two years of the facility's operation, and expand to include a Master of Science in Climate Change & Adaptation in year three.

Please advise if you have any questions, comments or recommendations.

Thanks,

Alex

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#### SMALL COMMUNITIES FUND - PROJECT INFORMATION FORM

					Project Location Information (1 item)	Information (1 Environmental Assessment and Aboriginal			Financial Information (7 items)						Progress Information (2 items)			
Climate Change and Adapation	Project Description  The University of Prince Edward Island is proposing to construct a 45,000 square foot research facility in St. Peter's, PEI.  The facility will enable applied research in the field of climate change via a highly collaborative approach involving undergraduate and graduate students, expert faculty and visiting researchers	Project Category Innovation	Project Sub- Category Post-secondary research and development laboratories and centres, and related teaching facilities		Ultimate it Recipient Typ Post- Secondary Institution		Is any part of the	Will Aboriginal	Is the project subject to an environmental		Requested SCF Contribution 4,866,667	Other Federal Contributions	If yes, please identify the program(s)	Provincial Contribution	Eligible Recipient Cost (Eligible costs) 4,866,666		Forecasted Construction Start Date 2019-07-01	Forecasted Construction End Date
Total	working with community, industry and government.									14,600,000	4,866,667	0		4,866,667	4,866,666			

- I, Darren Chaisson, Deputy Minister with the Province of Prince Edward Island , declare as follows:
- 1. That the information in this Project Information Form is accurate and valid based on the representations made by the Ultimate Recipient
- 2. And, that Projects submitted in the Project Information Form are deemed to be eligible and viable.

Dated, this 30th day of May 2019

Signature
Darren Chaisson, Deputy Minister

From:

Sent:	May 30, 2019 12:50 PM
To:	Olson, Spencer (INFC)
Subject:	RE: NBCF-PTIC-SCF Project Submission
Hi Spencer,	
Here are the docume	nts. Still waiting on ACES language though.
P·\Prince Edward Isla	nd\NBCF-PTIC\SCF\2. Projects\2.1 Project Intake List\Project list 3
1. (I Timee Lawara 1316	THE VIDEO TO THE SECTION OF THE PROPERTY OF THE SECTION OF THE SEC
Kelsey	
•	
From: Olson, Spence	
<b>Sent:</b> May 30, 2019 1	
	FC) <kelsey.scharf@canada.ca> IC-SCF Project Submission</kelsey.scharf@canada.ca>
Jubject. NE. NBCI -1	ie sei Troject submission
Please start preparin	g approval documentation.
Spencer Olson	
613-948-9148	
	ailto:jadalziel@gov.pe.ca]
Sent: May 30, 2019 1 To: Olson, Spencer (I	NFC) <spencer.olson@canada.ca></spencer.olson@canada.ca>
· · ·	er < <u>DLRHODENIZER.GOVMOBPO2.GOVMAIN@assembly.pe.ca</u> >; Scharf, Kelsey (INFC)
	da.ca>; Paul Godfrey < <u>JPGODFREY@gov.pe.ca</u> >
Subject: NBCF-PTIC-S	CF Project Submission
Hi Spencer,	
_, _, _, _, _,	
	or project information form, signed by the Deputy Minister, for the UPEI Canadian Centre for Adaptation Project. If you have any further questions please let us know.
Climate Change and	daptation Project. If you have any further questions please let us know.
Thanks,	
Alex	
	1

Scharf, Kelsey (INFC)

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From:

Sent:	May 31, 2019 8:58 AM
To:	El-Tannir, Tala (INFC)
Subject:	FW: NBCF-PTIC-SCF`Project Submission
Hi Tala,	
Could you input this project into	DIMCO Thomas
Could you input this project into	PINIS!
P:\Prince Edward Island\NBCF-P	TIC\SCF\2. Projects\2.1 Project Intake List\Project list 3
Kelsey	
From: Olson, Spencer (INFC)	
Sent: May 30, 2019 11:25 AM	
To: Scharf, Kelsey (INFC) < kelsey Subject: RE: NBCF-PTIC-SCF Proj	
Judge Control	cet Submission
Please start preparing approval	documentation.
Spencer Olson	
613-948-9148	
France Alou Dolaiol Impailtorio dala	ial@gay.pa gal
From: Alex Dalziel [mailto:jadalz Sent: May 30, 2019 11:13 AM	iei@gov.pe.caj
To: Olson, Spencer (INFC) < spen	cer.olson@canada.ca>
	DENIZER.GOVMOBPO2.GOVMAIN@assembly.pe.ca>; Scharf, Kelsey (INFC)
	Il Godfrey < <u>IPGODFREY@gov.pe.ca</u> >
Subject: NBCF-PTIC-SCF Project S	Submission
Hi Spencer,	
	nformation form, signed by the Deputy Minister, for the UPEI Canadian Centre for Project. If you have any further questions please let us know.
Thanks,	
Alex	
, ,	
	1
ressed under the provisions of the Acc	cess to Information Act / Page 459 of 516

Scharf, Kelsey (INFC)

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#### Olson, Spencer (INFC)

From:	
Sent:	

Olson, Spencer (INFC) May 31, 2019 2:44 PM

To:

Scharf, Kelsey (INFC)

Subject:

RE: PTIC-SCF - UPEI Project Description - DRAFT

Spencer Olson 613-948-9148

From: Scharf, Kelsey (INFC) Sent: May 31, 2019 2:43 PM

**To:** Olson, Spencer (INFC) <spencer.olson@canada.ca> **Subject:** FW: PTIC-SCF - UPEI Project Description - DRAFT

Hi Spencer,

Good to go on UPEI. No ACES language required.

Kelsey

From: Freiheit, Heidi (INFC) Sent: May 31, 2019 1:25 PM

**To:** Scharf, Kelsey (INFC) < <u>kelsey.scharf@canada.ca</u>> **Subject:** RE: PTIC-SCF - UPEI Project Description - DRAFT

Hui Kelsey,

I've reviewed the project and answers to the ACES questions and have no issues/concerns .

Thx, Heidi From: Trottier-Abbott, Catherine (INFC)

Sent: May 30, 2019 12:36 PM

To: Freiheit, Heidi (INFC) <heidi.freiheit@canada.ca>; Scharf, Kelsey (INFC) <kelsey.scharf@canada.ca>

Subject: FW: PTIC-SCF - UPEI Project Description - DRAFT

Thanks Kelsey, Heidi manages SCF projects for all regions so I'm forwarding this to her.

Kate

From: Scharf, Kelsey (INFC) Sent: May 30, 2019 12:22 PM

To: Trottier-Abbott, Catherine (INFC) < <a href="mailto:catherine.trottier-abbott@canada.ca">catherine.trottier-abbott@canada.ca</a>

Subject: FW: PTIC-SCF - UPEI Project Description - DRAFT

Hi Kate!

We received the following SCF project today. We need to get it to PRP as soon as possible. Anyway I can get language at your earliest convenience?:)

Thanks!

Kelsey

From: Alex Dalziel [mailto:jadalziel@gov.pe.ca]

**Sent:** May 30, 2019 8:57 AM

To: Olson, Spencer (INFC) < spencer.olson@canada.ca>

Cc: Darlene Rhodenizer < DLRHODENIZER@gov.pe.ca>; Paul Godfrey < JPGODFREY@gov.pe.ca>

Subject: Re: PTIC-SCF - UPEI Project Description - DRAFT

Hi Spencer,

See attached for SCF project submission spreadsheet with info on the UPEI Canadian Centre for Climate Change and Adaptation project. Let us know if you spot anything that needs revising. We should be able to get this printed off, signed and sent back sometime this morning.

Thanks,

Alex

>>> Alex Dalziel 5/30/2019 8:44 AM >>> Good Morning Spencer,

Alex

>>> "Olson, Spencer (INFC)" <<u>spencer.olson@canada.ca</u>> 5/29/2019 4:21 PM >>>

Sent from my iPhone

On May 29, 2019, at 3:07 PM, Alex Dalziel < jadalziel@gov.pe.ca > wrote:

Hi Spencer,

We are prepping the SCF submission form for the UPEI project and would like to get your take on the project description we're including. See project description below:

Project Description

The University of Prince Edward Island is proposing to construct a 45,000 square foot research facility in St. Peter's, PEI, which will be equipped with state of the art leading edge technology. The facility will enable applied research in the field of climate change via a highly collaborative approach involving undergraduate and graduate students, expert faculty and visiting researchers working with community, industry and government.

The University will offer the Bachelor of Applied Science in Climate Change & Adaptation for the first two years of the facility's operation, and expand to include a Master of Science in Climate Change & Adaptation in year three.

Please advise if you have any questions, comments or recommendations.

Thanks,

Alex

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n'avez pas le droit d'utiliser, de divulguer, de distribuer, de copier ou d'imprimer ce courriel ou en de vous en servir, et vous devriez le supprimer complètement de votre système informatique.	core

## Olson, Spencer (INFC)

From:

Scharf, Kelsey (INFC)

Sent:

May 31, 2019 2:49 PM

To:

PRP Secretariat / Secretariat GEP (INFC)

Cc:

Syed, Fariya (INFC); Olson, Spencer (INFC)

Subject:

PEI SCF List 3

**Attachments:** 

Annex A- Summary Report.xlsx; Annex B- Project List submission form.pdf; Briefing

Note.docx; PEI PRP Checklist SCF UPEI.docx

Good afternoon,

Please find attached the documents for Prince Edward Island's SCF List 3, for your review.

Thank you,

#### **Kelsey Scharf**

Analyst | Analyste Program Operations Branch | Direction générale des opérations Infrastructure Canada kelsey.scharf@canada.ca

Tél: 613-948-4487

# SMALL COMMUNITIES FUND - PROJECT INFORMATION FORM

Tombstone Information (6 items)				Project Location Information (1 Environmental Assessment and Aboriginal item) Consultation (3 Items)		Financial Information (7 items)			Progress Information (2 items)					
ect ID Project Title Project Description -SCF- Canadian The University of Prince Edward Island Is	Project Category Innovation	Project Sub- Category Post-secondary	Ultimate Recipies University of	Ultimate nt: Reciplent Typ Post-	St. Peter's, Prince	Is any part of the project located on federal lands?		Is the project subject d to an environmental assessment?		Ott Requested SCF Co Contribution (Ell 4,866,667	ther Federal if yes, please identify the identify the program(s)	Contribution	Eligible Othe Recipient Cost Contrib (Eligible costs) (Fligible 4,866,666	ition Construction Construction
Centre for Climate Change and Adapation The facility will enable applied research in the field of climate change via a highly collaborative approach involving undergraduate and graduate students, expert faculty and visiting researchers working with community, industry and government.		research and development laboratories and centres, and related teaching facilities		Secondary Institution	Edward Island	No	Yes	No	14,600,000	4,866,667		4,866,667	4,866,666	0

I, Darren Chaisson, Deputy Minister with the Province of Prince Edward Island , declare as follows:

2. And, that Projects submitted in the Project Information Form are deemed to be eligible and viable.

Dated, this 30th day of May 2019

Signature Darren Chaisson, Deputy Minister

<sup>1.</sup> That the information in this Project Information Form is accurate and valid based on the representations made by the Ultimate Recipient

# SMALL COMMUNITIES FUND - PROJECT INFORMATION FORM

Tombstone Information (6 items)	Project Location Information (1 item)	Environmental Assessment and Aboriginal Consultation (3 Items)	Financial Information (7 items)	Progress Information (2 items)
Project Project Sub- Ultimate Project III Project Title Project Description Category Ultimate Recipient Recipient Type	Project Address	Is any part of the Will Aboriginal Is the project subject project located on groups be consulted to an environmental federal lands? about the project? assessment?	Total Eligible Requested SCF Contributions identify the Contribution Contribution Contribution Contribution Contribution	Forecasted Forecasted Construction Construction Start Date End Date
2019-SCF- Canadian Centre for Climate Change and Adapation  The facility will enable applied research in the field of climate change via a highly collaborative approach involving undergraduate and graduate students, expert faculty and visiting researchers working with community, industry and government.  The University of Prince Edward Island is proposing to construct a 45,000 square foot research and development laboratories and centres, and related teaching facilities  University of Prince Edward Island Is	St. Peter's, Prince Edward Island	. No Yes No		2019-07-01 2021-08-30
Total ·		*	14,600,000 4,866,667 0 4,866,666 0	

Ministers of Infrastructure and Communities					
Signature					



PROTECTED B

#### **BRIEFING NOTE TO MINISTER CHAMPAGNE**

# RECOMMENDATION FOR FUNDING UNDER THE NEW BUILDING CANADA FUND - PROVINCIAL-TERRITORIAL INFRASTRUCTURE COMPONENT - SMALL COMMUNITIES FUND IN PRINCE EDWARD ISLAND (PROJECT LIST 3)

(For Signature)

#### **ISSUE**

 The purpose of this note is to seek your approval of the attached Summary Report #3 (Annex A) for one new project in Prince Edward Island with total eligible costs of \$14,600,000 to be funded under the Canada— Prince Edward Island Small Communities Fund (SCF) Funding Agreement (FA) under the New Building Canada Fund (NBCF).

#### HIGHLIGHTS/KEY CONSIDERATIONS

- On May 30, 2019, the Province of Prince Edward Island submitted a signed copy of Project List 3, which includes one new project.
- Summary Report #3 has been reviewed by INFC to confirm eligibility. Based on the information provided to INFC, which has been attested to by the provincial officials (Annex B), the project is eligible under the SCF.
- INFC officials and the Project Review Panel (PRP) reviewed the project list and confirm that the project is within your delegated authority and that Treasury Board approval is not required. Accordingly, the PRP supports the proposed recommendation that you may sign Summary Report #3 for funding the project under the SCF in Prince Edward Island (Annex C).
- Prince Edward Island's total allocation under the SCF is \$27,703,985. The project in Summary Report #3 represents a federal investment of \$4,866,667. Following your approval of this list, Prince Edward Island will have \$19,827,125, (72 percent) remaining under the SCF, including their administrative allocation.

#### **Risks and Mitigation**

 While there is always the possibility for project delays or cost overruns with any infrastructure project

The SCF FA commits

Prince Edward Island to ensuring that Ultimate Recipients complete projects as approved and assume responsibility for any cost overruns.

#### WebCIMS #

#### **KEY BACKGROUND**

- The Provincial-Territorial Infrastructure Component (PTIC) of the New Building Canada Fund (NBCF) dedicates 10 percent of the overall funding envelope, representing a federal contribution of \$1 billion across Canada, for projects benefitting communities with populations of 100,000 or less.
- As per the process identified in the program terms and conditions for project identification, selection and approval, Prince Edward Island has submitted project data and a description to the federal Co-chair of the Oversight Committee (OC) established under the FA. Provinces and Territories are responsible for the project selection process and overseeing the projects. The OC is responsible for monitoring the projects.
- The design of the SCF is significantly different than the PTIC National Regional Projects when it comes to the amount of project information that is received by the Government of Canada. Provinces and Territories provide the Government of Canada with a short project description sufficient for Infrastructure Canada (INFC) to conduct its due diligence for project eligibility under the program. As part of this due diligence, INFC reviews the project list to identify if projects are located on federal lands. The SCF agreements include a clause which indicates that payment is conditional upon Canada being satisfied that the province/territory's obligations under the Canadian Environmental Assessment Act, 2012 (CEAA, 2012) are met.

## RECOMMENDATION

- It is recommended that you approve and sign the attached Summary Report #3
   (Annex A) for funding under the Canada— Prince Edward Island SCF Funding
   Agreement. If you approve, a copy of the signed Summary Report #3 will be shared
   with Prince Edward Island and a joint communications event to announce the
   approval of the projects can proceed.
- INFC publicly committed to adhere to the following service standard for project lists within the Minister's delegation: "Approve project list within 25 business days of the date the final attested list is received." To meet this service standard, the Minister's approval is required by June 28, 2019.

WebCIMS #

#### **PROTECTED B**

Kelly Gillis Deputy Minister Infrastructure and Communities	Date
I approve I do not approve.	For discussion.
The Honourable François-Philippe Champagne, P.C., M.P. Minister of Infrastructure and Communities	Date

#### Attachments

Annex A – Summary Report #
Annex B – Project List Submission Form (signed)
Annex C – Project Review Panel Assessment Note

WebCIMS# 3

# PRP SCF Checklist and Sign-off Sheet

	SECTION A: Fundin	ıg Agı	eement Information			
	Tomb	stone			0.70	
1	Province/Territory		Prince Edward Island			
2	Date Funding Agreement signed	December 19, 2014				
3 4	Total allocation Administration allocation	\$27,703,985.00 \$ 277,040.00				
5	Total amount currently committed to projects \$ 3,137,114.00					
6	Balance remaining for projects \$24,693,792.00					
7	Number of projects approved to date		12			
	Notes:					
8						
	SECTION D	1-4-1-				
•		intake	information	N/A		
9	Date of intake process			N/A		
10	Number of applications received  Notes:		.	IN/F	<b>\</b>	
11	Notes.					
	SECTION C: P	roject	List Overview	100 M		
12	Date project list submitted by the Province	ce or <sup>-</sup>	Territory Co-chair	May 30	2019	
40	Did the project list include an attestation					
13	Co-chair		, , , , , , , , , , , , , , , , , , , ,	Yes ⊠	No □	
14	Total project eligible costs			\$14,60	0,000	
15	Federal share of project costs			\$4,866	,667	
16	Remaining funds sufficient to cover costs  Yes ☑ No □				No □	
17	Number of projects submitted			1		
18	Number of projects recommended 1					
	Cat	tegorie	es of Projects			
	Wastewater Infrastructure	0	Drinking Water Infra	astructure	0	
	Highways and Major Roads	0	Disaster Mitigation	Infrastructure	0	
	Infrastructure					
	Solid Waste Management	0	Brownfield Remedia		0	
	Infrastructure		Redevelopment Infi	rastructure		
4.0	Innovation	1	Green Energy Infra	structure	0	
19	Local and Regional Airport	0	Connectivity and Br	0		
	Infrastructure		Infrastructure			
	Short Sea Shipping Infrastructure	0	Shortline Rail Infras	0		
	Public Transit Infrastructure	0	Northern Infrastruct	0		
	Tourism	0	Recreation		0	
	Civic Assets and Municipal Buildings	0				
20	Notes:					
20	•					
100000	SECTION D: E	ligibil	lity of Projects			
				Yes	No	
21	All recipients are eligible under the progr			$\boxtimes$		
22	All projects are eligible on the basis of th	e info	rmation provided by			
	the Province/Territory					
23	All projects are under the Minister's delegation of authority					
24	All projects meet the objectives of their respective categories					
25	All projects have provided a response for EA/DTC information □					
26	Notes:	^				
07		z: Ger	neral Notes			
27	Notes:					
	i					

Prepared By:		
Analyst:		
	Date:	
Reviewed By:		
Manager:		
	Date:	
A/Director:		
	Date:	

## Annex A: Checklist Verification instructions

	SECTION A: Funding Agreement Information
#	Instructions
1.	Province or Territory that is party to the funding agreement under which the projects are being submitted.
2	Date that Funding agreement was signed.
3	Total SCF allocation to Province or Territory
4	Allocation for administrative costs from agreement (normally 1% of allocation)
5	Total amount currently committed for SCF in the Province or Territory
6	Enter the balance remaining for projects (should be equal to the Total SCF allocation minus the administrative costs and total amount currently committed).
7	Indicate number of projects approved to date
8	Provide any additional details as required

	SECTION B: Intake information
#	Instructions
9	Indicate dates of the intake process
10	Indicate number of applications received
11	Provide any additional details as required

	SECTION C: Project List Overview
#	Instructions
12	Enter date project list was received from the Province or Territory
13	Was the project list signed by the Province or Territory Co-Chair attesting to projects' eligibility and viability.
14	Enter the total project costs for the projects on the lists that are being recommended for approval.
15	Enter the federal share of project costs for the projects on the lists that are being recommended for approval.
16	Is the balance remaining for projects (box 6) higher than or equal the federal share of project costs (box 19)
17	Indicate number of projects submitted on the project list.
18	Indicate number of projects being recommended to the Minister. If the number of projects being recommended is different than the number submitted by the Province or Territory, please provide additional information in Notes section (box 20).
19	Provide a breakdown of the number of projects by category.
20	Provide any additional details as required

	SECTION D: Eligibility of Projects
#	Instructions
21	All recipients are eligible under the program terms and conditions
22	All projects are eligible on the basis of the information provided by the Province/Territory
23	All projects are under the Minister's delegation of authority
24	All projects meet the objectives of their respective categories
25	All projects have been reviewed for completeness of EA/DTC information provided. If further information is needed or follow-up required for a particular project, please include a note.
26	Provide any additional details as required

	SECTION E: General Notes
#	Verification Instructions
27	Include any additional information that PRP should be aware of.

#### Olson, Spencer (INFC)

From:

Olson, Spencer (INFC)

Sent:

June 5, 2019 8:31 AM

To:

Sausins, Katrine (INFC)

Cc:

Sierra, Monica Alejandra (INFC); McKenzie, Vicki (INFC); Faruqui, Natasha (INFC)

Subject:

RE: MinO Request for call - UPEI

Left a message with John this morning.

Spencer Olson 613-948-9148

From: Sausins, Katrine (INFC) Sent: June 4, 2019 4:29 PM

To: Olson, Spencer (INFC) < spencer.olson@canada.ca>

Cc: Sierra, Monica Alejandra (INFC) <monicaalejandra.sierra@canada.ca>; McKenzie, Vicki (INFC)

<vicki.mckenzie@canada.ca>; INFC.O PO.ADMO.Users/Utilisateurs.OP.BSMA O.INFC <INFC.PO.ADMO.Users-

Utilisateurs.OP.BSMA.INFC@canada.ca> **Subject:** FW: MinO Request for call - UPEI

Good afternoon!

John Hearn in MINO is looking to speak with someone on UPEI. Can someone from POB please call him? His number is

Thank you, Katrine

## La Rue, Jean-François (INFC)

From:

La Rue, Jean-François (INFC)

Sent:

June 6, 2019 9:10 AM

To:

Chan, Jeanna (INFC); Eyre, Jennifer (INFC)

Cc:

Olson, Spencer (INFC); Syed, Fariya (INFC); INFC.O

PO.ADMO.Users/Utilisateurs.OP.BSMA O.INFC

Subject:

MINO question at pipeline FW: UPEI Project (NBCF)

Salut

At Pipeline, MINO asked if UPEI was considered under green.

See below

Tks

From: Olson, Spencer (INFC) Sent: June 6, 2019 9:05 AM

To: La Rue, Jean-François (INFC) < jean-francois.larue@canada.ca>

Cc: Syed, Fariya (INFC) <fariya.syed@canada.ca>; Paul Godfrey <JPGODFREY@gov.pe.ca>

Subject: UPEI Project (NBCF)

Jean-François,

I can confirm that the UPEI project was never discussed with the Province as a potential ICIP-Green Stream project.

The application was first submitted by the Province under

NBCF-PTIC-NRP and has since been shifted to NBCF-PTIC-SCF.

Spencer Olson 613-948-9148

Subject:

101 - PEI SCF project list #3

Location:

JF's office

Start:

Thu 2019-06-13 8:45 AM

End:

Thu 2019-06-13 9:00 AM

**Show Time As:** 

Tentative

Recurrence:

(none)

**Meeting Status:** 

Not yet responded

Organizer:

La Rue, Jean-François (INFC)

**Required Attendees:** 

Olson, Spencer (INFC); Scharf, Kelsey (INFC); Syed, Fariya (INFC)

Pre-Brief: PEI project going to PRP 51677 PEI PTIC NRP Project list 3

Please bring copies of the template of questions received and our answers (if we have received any)

Thank you!

From:

Scharf, Kelsey (INFC)

Sent:

June 11, 2019 1:44 PM

To:

Freiheit, Heidi (INFC)

Subject:

RE: PTIC-SCF - UPEI Project Description - DRAFT

Thanks Heidi!!

From: Freiheit, Heidi (INFC) Sent: June 11, 2019 1:11 PM

To: Scharf, Kelsey (INFC) < kelsey.scharf@canada.ca>; Olson, Spencer (INFC) < spencer.olson@canada.ca>

Subject: RE: PTIC-SCF - UPEI Project Description - DRAFT

Hello folks,

Perhaps the explanation below would help with PRP:

SCF was designed using a risk-based approach to the legal DTC as the projects were small in nature and the department at the time chose to rely solely on PTs or other federal processes to conduct consultation where required. SCF was also developed in 2014, prior to the Government of Canada making a commitment towards the Indigenous Reconciliation Rights Framework therefore, SCF is not designed with these considerations in mind. Amendments were made to Tc and Cs to SCF in 2018 where it was indicated that INFC reserved the right to conduct additional consultation if warranted, based on the type of project (e.g. for a new wharf). In 2016, INFC's approach evolved for PTIF-CWWF (which is a program for small projects) where INFC reviewed all projects using a triaging process and did a detailed review on a subset of project proposals and in 2018, INFC's approach evolved to developing exclusion criteria and essentially completing a review for all projects that are not excluded.

Pls let me know if you have any further questions.

Thx, Heidi

From: Scharf, Kelsey (INFC)
Sent: June 11, 2019 10:40 AM

**To:** Freiheit, Heidi (INFC) < heidi.freiheit@canada.ca > **Subject:** FW: PTIC-SCF - UPEI Project Description - DRAFT

ect: 2.2 SCF PEI List #3

\\fs-ncr-400\ino\OFFICE OF INFRASTRUCTURE OF CANADA\ PRP PROJECT REVIEW PANEL\6) NBCF-PTIC SCF\PEI\List 3\3. Revised docs

From: Scharf, Kelsey (INFC) Sent: May 31, 2019 1:44 PM

**To:** Freiheit, Heidi (INFC) < <a href="mailto:heidi.freiheit@canada.ca">heidi.freiheit@canada.ca</a> **Subject:** RE: PTIC-SCF - UPEI Project Description - DRAFT

Thanks Heidi!

Does that mean there is no language that needs to be in the Briefing Note?

Kelsey

From: Freiheit, Heidi (INFC) Sent: May 31, 2019 1:25 PM

**To:** Scharf, Kelsey (INFC) < <u>kelsey.scharf@canada.ca</u>> **Subject:** RE: PTIC-SCF - UPEI Project Description - DRAFT

Hui Kelsey,

I've reviewed the project and answers to the ACES questions and have no issues/concerns.

Thx, Heidi

From: Trottier-Abbott, Catherine (INFC)

**Sent:** May 30, 2019 12:36 PM

To: Freiheit, Heidi (INFC) < heidi.freiheit@canada.ca >; Scharf, Kelsey (INFC) < heidi.freiheit@canada.ca >

Subject: FW: PTIC-SCF - UPEI Project Description - DRAFT

Thanks Kelsey, Heidi manages SCF projects for all regions so I'm forwarding this to her.

Kate

From: Scharf, Kelsey (INFC) Sent: May 30, 2019 12:22 PM

To: Trottier-Abbott, Catherine (INFC) < <a href="mailto:catherine.trottier-abbott@canada.ca">catherine.trottier-abbott@canada.ca</a>

Subject: FW: PTIC-SCF - UPEI Project Description - DRAFT

Hi Kate!

We received the following SCF project today. We need to get it to PRP as soon as possible. Anyway I can get language at your earliest convenience?:)

Thanks!

Kelsey

From: Alex Dalziel [mailto:jadalziel@gov.pe.ca]

Sent: May 30, 2019 8:57 AM

To: Olson, Spencer (INFC) < spencer.olson@canada.ca>

Cc: Darlene Rhodenizer < DLRHODENIZER@gov.pe.ca >; Paul Godfrey < JPGODFREY@gov.pe.ca >

Subject: Re: PTIC-SCF - UPEI Project Description - DRAFT

Hi Spencer,

See attached for SCF project submission spreadsheet with info on the UPEI Canadian Centre for Climate Change and Adaptation project. Let us know if you spot anything that needs revising. We should be able to get this printed off, signed and sent back sometime this morning.

Thanks,

Alex

>>> Alex Dalziel 5/30/2019 8:44 AM >>> Good Morning Spencer,

Alex

>>> "Olson, Spencer (INFC)" <<u>spencer.olson@canada.ca</u>> 5/29/2019 4:21 PM >>>

On May 29, 2019, at 3:07 PM, Alex Dalziel < jadalziel@gov.pe.ca > wrote:

Hi Spencer,

We are prepping the SCF submission form for the UPEI project and would like to get your take on the project description we're including. See project description below:

# **Project Description**

The University of Prince Edward Island is proposing to construct a 45,000 square foot research facility in St. Peter's, PEI, which will be equipped with state of the art leading edge technology. The facility will enable applied research in the field of climate change via a highly collaborative approach involving undergraduate and graduate students, expert faculty and visiting researchers working with community, industry and government.

The University will offer the Bachelor of Applied Science in Climate Change & Adaptation for the first two years of the facility's operation, and expand to include a Master of Science in Climate Change & Adaptation in year three.

Places advice i	fvall	have an	av quactions	comments or	recommendations.
riease auvise i	ı you	nave an	ry questions,	comments or	recommendations.

Γhanks,		
Alex		

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#### Olson, Spencer (INFC)

From:

Olson, Spencer (INFC)

Sent:

June 28, 2019 11:03 AM

To:

Law, Larissa (INFC)

Cc:

Villeneuve, Elizabeth (INFC)

Subject:

RE: \*\*For POB Confirmation: Approval of the Canadian Centre for Climate Change and

Adaptation - UPEI

Attachments:

51677 Signed List.pdf; 51677 Signed BN.pdf

See attached.

Spencer Olson 613-948-9148

From: Villeneuve, Elizabeth (INFC) Sent: June 28, 2019 11:02 AM

To: Olson, Spencer (INFC) < spencer.olson@canada.ca>

Subject: RE: \*\*For POB Confirmation: Approval of the Canadian Centre for Climate Change and Adaptation - UPEI

As discussed.

From: Law, Larissa (INFC) Sent: June 28, 2019 10:55 AM

To: Villeneuve, Elizabeth (INFC) <elizabeth.villeneuve@canada.ca>

Cc: Chung-How, Catherine (INFC) <catherine.chung-how@canada.ca>; Archambault, Michel (INFC)

<michel.archambault@canada.ca>

Subject: \*\*For POB Confirmation: Approval of the Canadian Centre for Climate Change and Adaptation - UPEI

Importance: High

HI Elizabeth,

Checking in to see if the below project in PEI has received approval? I've been told by MinO that is has.

Project#	Program	Location	Standardized Category	Title (EN)	Total Eligible Cost	P Con
54364	SCF	Undefined	Innovation	Canadian Centre for Climate Change and Adaptation	\$14,600,000	\$4,

Thank you!

ATIA - 16(2)

#### Larissa Law

Communications Advisor; Communications, Events and Ministerial Services Infrastructure Canada / Government of Canada larissa.law@canada.ca / Tel: 613-960-5664;

Conseillère en communications; Communications, évènements ministériels et consultatifs Infrastructure Canada / Gouvernement du Canada

larissa.law@canada.ca / Tél.: 613-960-5664;

#### SMALL COMMUNITIES FUND - PROJECT INFORMATION FORM

Eligible   Eligible			Tombstone Information (6 item	s)			4	Project Location Information (1 item)	Environmental Ass	essment and Aborigi Items)	nal Consultation (3	3 Financial Information (7 items)							Progress Infor	mation (2 items)
19-SCF Canadian The University of Prince Edward Island is proposing Innovation Centre for Centre for Climate Change and Adapation The facility will enable applied research in the field of climate change via a highly collaborative approach involving undergraduate and graduate students, expert faculty and visiting researchers working with community, industry and government.	oject ID	Project Title	Project Description				Recipient		project located on	groups be consulted about	subject to an environmental	A CONTRACTOR OF THE PARTY OF TH	SCF	Contributions	identify the	Contribution (Eligible	Recipient Contribution (Eligible	Contribution (Eligible	Forecasted Construction Start	Forecasted
	17	Centre for Climate Change and Adapation	to construct a 45,000 square foot research facility in St. Peter's, PEI.  The facility will enable applied research in the field of climate change via a highly collaborative approach involving undergraduate and graduate students, expert faculty and visiting researchers working with community, industry and		Post-secondary research and development laboratories and centres, and related teaching	Prince Edward	Secondary	St. Peter's, Prince	No	Yes	No			[Engline scose)				costs) O		eonsiauxilon (and 1)5 2021-08-

Ministers of Infragrueture and Communities

Signature



# BRIEFING NOTE TO THE MINISTER OF INFRASTRUCTURE AND COMMUNITIES

# PROVINCIAL-TERRITORIAL INFRASTRUCTURE COMPONENT SMALL COMMUNITIES FUND IN PRINCE EDWARD ISLAND (PROJECT LIST #3)

(For Signature)

# **PURPOSE**

The purpose of this note is to seek your approval of the attached Summary Report #3 (Annex A) for one new project in Prince Edward Island with total eligible costs of \$14,600,000 to be funded under the Canada—Prince Edward Island Small Communities Fund (SCF) Funding Agreement (FA) under the New Building Canada Fund (NBCF).

#### HIGHLIGHTS/KEY CONSIDERATIONS

- On May 30, 2019, the Province of Prince Edward Island submitted a signed copy of Project List #3, which includes one new project. This project was initially prioritized by the Province on March 29, 2018.
- Summary Report #3 has been reviewed by INFC to confirm eligibility. Based on the information provided to INFC, which has been attested to by provincial officials (Annex B), the project is eligible under the SCF.
- INFC officials and the Project Review Panel (PRP) reviewed the project list and confirm that the project is within your delegated authority and that Treasury Board approval is not required. Accordingly, INFC recommends and the PRP supports the proposed recommendation that you may sign Summary Report #3 for funding the project under the SCF in Prince Edward Island (Annex C).
- Prince Edward Island's total allocation under the SCF is \$27,703,985. The project in Summary Report #3 represents a federal investment of \$4,866,666. Following your approval of this list, Prince Edward Island will have \$20,106,298.23, (73 percent) remaining under the SCF, including their administrative allocation.

WebCIMS #: 51677

# **Risks and Mitigation**

 While there is always the possibility for project delays or cost overruns with any infrastructure project,

The SCF FA commits

Prince Edward Island to ensuring that Ultimate Recipients complete projects as approved and assume responsibility for any cost overruns.

# **KEY BACKGROUND**

- The Provincial-Territorial Infrastructure Component (PTIC) of the New Building Canada Fund (NBCF) dedicates 10 percent of the overall funding envelope, representing a federal contribution of \$1 billion across Canada, for projects benefitting communities with populations of 100,000 or less.
- As per the process identified in the program terms and conditions for project identification, selection and approval, Prince Edward Island has submitted project data and a description to the federal Co-chair of the Oversight Committee (OC) established under the FA. Provinces and Territories are responsible for the project selection process and overseeing the projects. The OC is responsible for monitoring the projects.
- The design of the SCF is significantly different than the PTIC National Regional Projects when it comes to the amount of project information that is received by the Government of Canada. Provinces and Territories provide the Government of Canada with a short project description sufficient for Infrastructure Canada (INFC) to conduct its due diligence for project eligibility under the program. As part of this due diligence, INFC reviews the project list to identify if projects are located on federal lands. The SCF agreements include a clause which indicates that payment is conditional upon Canada being satisfied that the province/territory's obligations under the Canadian Environmental Assessment Act, 2012 (CEAA, 2012) are met.

# **RECOMMENDATIONS**

- It is recommended that you approve and sign the attached Summary Report #3
   (Annex A) for funding under the Canada Prince Edward Island SCF Funding
   Agreement. If you approve, a copy of the signed Summary Report #3 will be shared
   with Prince Edward Island and a joint communications event to announce the
   approval of the projects can proceed.
- INFC publicly committed to adhere to the following service standard for project lists
  within the Minister's delegation: "Approve project list within 25 business days of the
  date the final attested list is received." To meet this service standard, the Minister's
  approval is required by June 28, 2019.

Kelly Gillis Deputy Minister Infrastructure and Communities	June 18/15 Date
I approve.	For discussion.
	JUN 2 7 <b>2019</b>
The Honourable François-Philippe Champagne, P.C., M.P.	Date
Minister of Infrastructure and Communities	

#### Attachments:

Annex A – Summary Report #3

Annex B – Project List Submission Form (signed)

Annex C - Project Review Panel Assessment Note

# SMALL COMMUNITIES FUND - PROJECT INFORMATION FORM

	ms)				Project Location Information (1 item)		ital Assessment a onsultation (3 Ite				Financial Informatio	n (7 items)		Progress Information (2 items)
ect ID Project Title Project Description -SCF- Canadian The University of Prince Edward Island Is	Project Category Innovation	Project Sub- Category Post-secondary	Ultimate Recipies University of	Ultimate nt: Reciplent Typ Post-	St. Peter's, Prince	Is any part of the project located on federal lands?		Is the project subject d to an environmental assessment?		Ott Requested SCF Co Contribution (Ell 4,866,667	ther Federal if yes, please identify the identify the program(s)	Contribution	Eligible Othe Recipient Cost Contrib (Eligible costs) (Fligible 4,866,666	ition Construction Construction
Centre for Climate Change and Adapation The facility will enable applied research in the field of climate change via a highly collaborative approach involving undergraduate and graduate students, expert faculty and visiting researchers working with community, industry and government.		research and development laboratories and centres, and related teaching facilities		Secondary Institution	Edward Island	No	Yes	No	14,600,000	4,866,667		4,866,667	4,866,666	0

I, Darren Chaisson, Deputy Minister with the Province of Prince Edward Island , declare as follows:

- 1. That the information in this Project Information Form is accurate and valid based on the representations made by the Ultimate Recipient
- 2. And, that Projects submitted in the Project Information Form are deemed to be eligible and viable.

Dated this 30th day of May 2019
Signature
Darren Chaisson, Deputy Minister

# SMALL COMMUNITIES FUND - PROJECT INFORMATION FORM

Tombstone Information (6 items)	Project Location Information (1 item)	Environmental Assessment and Aboriginal Consultation (3 Items)	Financial Information (7 items)	Progress Information (2 items)
Project Project Sub- Ultimate Project III Project Title Project Description Category Ultimate Recipient Recipient Type	Project Address	Is any part of the Will Aboriginal Is the project subject project located on groups be consulted to an environmental federal lands? about the project? assessment?	Total Eligible Requested SCF Contributions identify the Contribution Contribution Contribution Contribution Contribution	Forecasted Forecasted Construction Construction Start Date End Date
2019-SCF- Canadian Centre for Climate Change and Adapation  The facility will enable applied research in the field of climate change via a highly collaborative approach involving undergraduate and graduate students, expert faculty and visiting researchers working with community, industry and government.  The University of Prince Edward Island is proposing to construct a 45,000 square foot research and development laboratories and centres, and related teaching facilities  University of Prince Edward Island Is	St. Peter's, Prince Edward Island	. No Yes No		2019-07-01 2021-08-30
Total ·		*	14,600,000 4,866,667 0 4,866,666 0	

Ministers of Infrastructure and Communities
Signature



# MEMORANDUM TO THE DEPUTY MINISTER

# NEW BUILDING CANADA FUND – PROVINCIAL TERRITORIAL INFRASTRUCTURE COMPONENT – SMALL COMMUNITIES FUND AGREEMENT WITH THE PROVINCE OF PRINCE EDWARD ISLAND

# (FOR DECISION)

## **Summary**

This note provides you assurance that the Minister may proceed to approve the project listed in Summary Report #3 for the Province of Prince Edward Island under the New Building Canada Fund – Provincial Territorial Infrastructure Component – Small Communities Fund without a Treasury Board (TB) submission. The Project Review Panel (PRP) is satisfied that the project listed in Summary Report #3 for the Province of Prince Edward Island do not require TB approval.

## **Background**

The PRP reviewed the project in the Summary Report #3 for the Province of Prince Edward Island as well as the draft briefing note to the Minister.

#### **Assessment**

# Assessment of TB Approval Requirement

According to the New Building Canada Fund – Provincial Territorial Infrastructure Component (NBCF-PTIC) terms and conditions

the Minister has delegated authority to approve projects and sign contribution agreements where the federal contribution is up to and including \$50 million, subject to certain exceptions. At this review stage of the projects, the PRP has reviewed the materials against the exceptions and confirms that TB approval is not required. However, if during the implementation of a project it becomes apparent that an exception or an exemption has been triggered, then PRP would be advised that a TB submission is required.



# Assessment Against Policy Criteria

The PRP reviewed the project in Summary Report #3 and is satisfied that the project meet all applicable requirements of government policy on the parameters of the program.

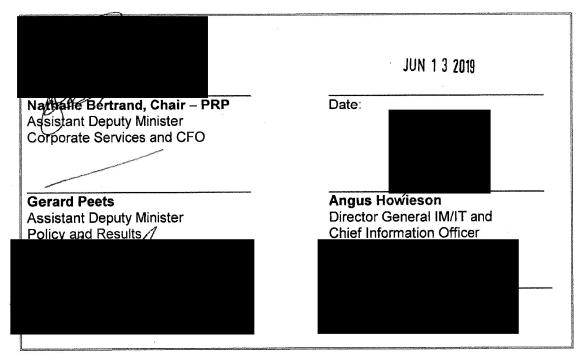
# Assessment of Chief Financial Officer (CFO) Accountabilities

Based on the Summary Report, the PRP confirms that the project:

- ✓ conforms to government policy on the parameters of the program;
- ✓ conforms to Treasury Board policy; and
- ✓ conforms with the terms and conditions of the program.

#### Recommendation

The PRP recommends that you support the recommendations in the Memorandum to the Minister.



Prepared by:

*1*019 ⋅ 06 ⋅ 13

Secretary to the PRP Secretariat

# Olson, Spencer (INFC)

From:

Villeneuve, Elizabeth (INFC)

Sent:

July 3, 2019 12:35 PM

To:

Olson, Spencer (INFC)

Subject:

FW: \*\*For POB Quick Review and Approval: Draft Products for the UPEI Canadian Centre

for Climate Change and Adaptation (SCF, PE) - 5-July-19

**Attachments:** 

01 - NR - UPEI Centre for Climate Change - EN - MGR A.DOCX; 02 - SN - UPEI Centre for Climate Change - EN - MGR A.DOCX; 06 - DP - UPEI Centre for Climate Change -

MGR A.DOCX

For your review. Thanks.

From: Law, Larissa (INFC)
Sent: July 3, 2019 12:34 PM

To: Villeneuve, Elizabeth (INFC) <elizabeth.villeneuve@canada.ca>

Cc: Chung-How, Catherine (INFC) <catherine.chung-how@canada.ca>; Archambault, Michel (INFC)

<michel.archambault@canada.ca>

Subject: \*\*For POB Quick Review and Approval: Draft Products for the UPEI Canadian Centre for Climate Change and

Adaptation (SCF, PE) - 5-July-19

Hi Elizabeth,

For your review, and comment, please find attached the draft communications products for the UPEI Canadian Centre for Climate Change and Adaptation funding announcement happening on Friday.

If you could provide your feedback at your earliest convenience, MinO has requested to see the products as soon as possible.

Everything for your review is highlighted in yellow.

Thank you, and please let me know if you have any questions.

#### Larissa Law

Communications Advisor; Communications, Events and Ministerial Services Infrastructure Canada / Government of Canada larissa.law@canada.ca / Tel: 613-960-5664;

Conseillère en communications; Communications, évènements ministériels et consultatifs

Infrastructure Canada / Gouvernement du Canada

larissa.law@canada.ca / Tél.: 613-960-5664;

# Canadä



News release

For immediate release

Prince Edward Island to benefit from new UPEI research center for climate change and adaptation

Saint Peter's Bay, Prince Edward Island, July 5, 2019—Investments in scientific innovation and post-secondary education are essential for providing increased access to higher learning for Canadians, and to develop meaningful collaboration with communities, industry leaders, researchers and regional governments.

Today, the Honourable Lawrence MacAulay, Minister of Veterans Affairs and Associate Minister of National Defence, and Member of Parliament for Cardigan, on behalf of the Honourable François-Philippe Champagne, Minister of Infrastructure and Communities; the Honourable Dennis King, Premier of Prince Edward Island; and Dr. Alaa Abd-El-Aziz, President and Vice-Chancellor of the University of Prince Edward Island announced funding for the Canadian Centre for Climate Change and Adaptation at the University of Prince Edward Island (UPEI).

The project consists of constructing a 45,000 square foot research facility in the town of Saint Peter's Bay, PEI. The facility will house a state-of-the-art Climate Research Lab and a living laboratory that allows for unlimited access to nearby wetlands, forests and coastal habitats directly affected by climate change.

Once complete, this facility will support higher learning programs like UPEI's Bachelor of Science in Applied Climate Change and Adaptation, and a Master's program in Climate Change and Adaptation, preparing graduates to play a key role in developing policies that respond to and mitigate the effects of climate change.

The governments of Canada and Prince Edward Island are both investing over \$4.8 million in this project through the New Building Canada Fund – Provincial-Territorial Infrastructure Component.

#### Quotes

"The Canadian Centre for Climate Change and Adaptation will set the standard for climate change education, research and collaboration across private and public sectors. The centre will provide skills to our future leaders to help mitigate and adapt to climate change, as well as stimulating regional economic growth and driving innovation. We are committed to investing in education, research and technology that will strengthen Canada's transition to a low-carbon economy, creating a greener environment for generations to come."

The Honourable Lawrence MacAulay, Minister of Veterans Affairs and Associate Minister of National Defence, and Member of Parliament for Cardigan, on behalf of the Honourable François-Philippe Champagne, Minister of Infrastructure and Communities

"[Provincial quote ...]"

The Honourable Dennis King, Premier of Prince Edward Island

"[Proponent quote ... ]"

Dr. Alaa Abd-El-Aziz, President and Vice-Chancellor of the University of Prince Edward Island

ATIA - 21(1)(a)
ATIA - 21(1)(b)

#### Quick facts

- Through the *Investing in Canada* infrastructure plan, the Government of Canada is investing more than \$180 billion over 12 years in public transit projects, green infrastructure, social infrastructure, trade and transportation routes, and Canada's rural and northern communities.
- \$26.9 billion of this funding is supporting green infrastructure projects, including \$5 billion available for investment through the Canada Infrastructure Bank.
- On June 27, 2019, the Government of Canada launched two new strategies: Canada's Connectivity Strategy, which commits to connect all Canadians to high-speed internet, and Canada's first Rural Economic Development Strategy, which will spur economic growth and create good, middle class jobs for rural Canadians across the country.
- The Rural Economic Development Strategy leverages ongoing federal investments and provides a vision for the future, identifying practical steps to take in the short term, and serving as a foundation to guide further work.
- Central to Canada's Connectivity Strategy are historic new investments that are
  mobilizing up to \$6 billion toward universal connectivity. They include a top-up to the
  Connect to Innovate Program, a new Universal Broadband Fund, and investments from
  the Canada Infrastructure Bank.
- These investments complement the Atlantic Growth Strategy, a federal-provincial action plan aimed at stimulating economic growth in the region through five priority areas:
  - Skilled workforce/Immigration;
  - o Innovation:
  - o Clean growth and climate change;
  - Trade and investment;
  - Infrastructure.

#### Associated links

Investing in Canada Plan Project Map: http://www.infrastructure.gc.ca/map

Federal infrastructure investments in Prince Edward Island: https://www.infrastructure.gc.ca/investments-2002-investissements/pe-eng.html

Rural Opportunity, National Prosperity: An Economic Development Strategy for Rural Canadal https://www.infrastructure.gc.ca/rural/strat-eng.html

Investing in Canada: Canada's Long Term Infrastructure Plan:

http://www.infrastructure.gc.ca/plan/icp-publication-pic-eng.html

Atlantic Growth Strategy: http://www.acoa-apeca.gc.ca/ags-sca/Eng/atlantic-growth.html

- 30 -

#### Contacts

Ann-Clara Vaillancourt
Press Secretary
Office of the Minister of Infrastructure and Communities
613-697-3778
ann-clara.vaillancourt@canada.ca

Katie MacDonald Communications Officer Transportation, Infrastructure and Energy 902-314-3996



#### katiemacdonald@gov.pe.ca

Nicole Phillips, BComm Acting Director, Marketing and Communications University of Prince Edward Island 902-566-0947 nphillips@upei.ca

Media Relations Infrastructure Canada 613-960-9251

Toll free: 1-877-250-7154

Email: infc.media.infc@canada.ca

Follow us on Twitter, Facebook and Instagram
Web: Infrastructure Canada

#### **SPEAKING NOTES**

# FOR

THE HONOURABLE LAWRENCE MACAULAY,

Minister of Veterans Affairs and Associate Minister of National Defence, and Member of Parliament for Cardigan,

on behalf of the Honourable François-Philippe Champagne,

Minister of Infrastructure and Communities

ON THE OCCASION OF THE

**FUNDING ANNOUNCEMENT EVENT** 

**FOR** 

The Canadian Centre for Climate Change and Adaptation at the University of Prince Edward

Saint Peter's Bay, Prince Edward Island Friday, July 5<sup>th</sup>, 2019

**CHECK AGAINST DELIVERY** 

#### Good morning.

Thank you for that kind introduction, Ms. [Jackie] Podger [Vice-President Administration and Finance, University of Prince Edward Island].

It's a great pleasure to be here with Premier [Dennis] King, and Doctor [Alaa] Abd-El Aziz [President and Vice-Chancellor of the University of Prince Edward Island], today for this important announcement, on behalf of the Minister of Infrastructure and Communities, the Honourable François-Philippe Champagne.

The Government of Canada is making historic investments in infrastructure to grow our country's economy and improve Canadians' quality of life. Thanks to our \$180-billion, 12-year infrastructure plan, thousands of projects are under way or already completed nationwide.

Our investments have supported new or better access to high-speed internet for over 900 rural and remote communities, giving Canadians better access to services and helping them do business, learn, and connect with family and friends.

More than 1,400 clean water and wastewater systems have been built or repaired to keep Canadians healthy and our waterways clean.

We've supported repairs and upgrades to more than 2,500 kilometres of roads and highways across the country, helped build over 190 kilometres of new highway, and funded more than 70 new bridges. This is helping Canadians spend less time on the road and more time with loved ones.

We recognize that rural communities drive our success as a country, and that's why we're providing more than \$2 billion over ten years for projects in these areas through our infrastructure plan.

We've also increased our share of investments for projects in communities with fewer than 5,000 residents to cover 60% of the total costs.

I am proud of the work that has already been done for communities across Canada. Our investments in communities throughout Prince Edward Island will help grow local economies, build stronger and more inclusive communities, and safeguard the environment and the health of Canadians for years to come.

In PEI, we have invested over \$160 million in 70 projects through the infrastructure plan so far.

Commented [LL1]: From most recent MinO Comms numbers

And today, I'm very pleased to announce that we will be investing over \$4.8 million in the new Canadian Centre for Climate Change and Adaptation at the University of Prince Edward Island (UPEI).

This large, innovative facility will be a model of environmental and climate change research in the higher learning community. It will house a state-of-the-art climate research lab and a "living laboratory" with access to nearby wetlands, forests and coastal habitats affected by climate change.

The facility will also allow UPEI to offer innovative learning programs to students, like a Bachelor of Science in Applied Climate Change and Adaptation, or a Master's in Climate Change and Adaptation. This new facility will prepare graduates to develop policies that mitigate and respond to the effects of climate change.

Once complete, the centre will be a leader in collaborative learning and research, working together with communities across PEI, and all levels of governments. It will stimulate regional economic growth and drive innovation.

[Minister's personal input about the project and its significance to the community.]

Today's announcement is one example of our commitment to bring greater opportunities to Canada's rural communities, ensuring their success and sustainability for years to come.

However, we also recognize that communities face many challenges to their prosperity and quality of life. And we understand that our communities know what they need most to address these challenges.

That is why, last week, Infrastructure Canada launched the country's first rural economic development strategy, called "Rural Opportunity, National Prosperity."

The Strategy was launched alongside Canada's Connectivity Strategy, which was prepared by Innovation, Science and Economic Development Canada.

The Rural Economic Development Strategy highlights and responds to the challenges, ideas and opportunities raised by rural communities. It is a roadmap for the future prosperity of northern and rural Canada. It looks at how we can work better together with our partners to maximize our investments and consider decisions from a northern and rural perspective.

Most importantly, the strategy demonstrates that people, places, and partnerships are at the center of rural economic development.

By investing in the infrastructure that communities need, the Government of Canada is helping everyone reach their full potential and share in our nation's prosperity.

And toady, we're paving the way for a bright future.

This is what Canadians deserve and we look forward to building it with you.

Thank you.

# Digital Products

Event Title: Canadian Centre for Climate Change and Adaptation

Location: Saint Peter's Bay, Prince Edward Island

Fund: \$4,866,667 (SCF)

<u>Benefit Statement</u>: Building Sustainable Communities / Bâtir des collectivités durables **Useful Hashtags/Handles**: #BuildingCommunities #BâtirCommunautés #RuralOpportunity

#PossibiliésRurales @InfoPEI @UPEI



# INFC Twitter Account

# @INFC eng

# @INFC fra

# **Tweet**

Tweet One:

Post Event Tweet:

Supporting education and research on climate change mitigation and adaptation today in #PEI (sun emoji) (tree emoji) (leaf emoji) (wave emoji) (InfoPEI (uppei #BuildingCommunities #RuralOpportunity [Photo from PEI]

# Photo/Graphic

[to accompany tweet one]
Designer: Please use the Project Signage
infographic with the Rural signage
background and the pink social infrastructure
icon.

Suggested text:

Supporting Education in Climate Change Mitigation and Adaptation Building Sustainable Communities \$4.8 M

Logos: Gov. of Canada (bottom left); Prov. of Prince Edward Island (bottom right)

Example:

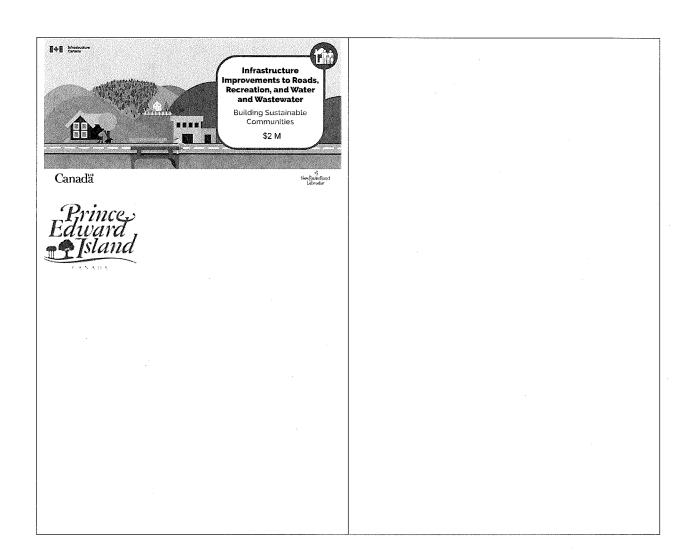
# Gazouillis

Tweet One:

http://infc.gc.ca/xxxx #bâtirlecanada #PossibiliésRurales [with infographic]

Poste Event Tweet: #bâtirlecanada [Photo from PE]

Photo/Graphic







#### **BRIEFING NOTE TO MINISTER CHAMPAGNE**

# PROVINCIAL-TERRITORIAL INFRASTRUCTURE COMPONENT - SMALL COMMUNITIES FUND IN PRINCE EDWARD ISLAND (PROJECT LIST 3)

(For Signature)

## **ISSUE**

 The purpose of this note is to seek your approval of the attached Summary Report #3 (Annex A) for one new project in Prince Edward Island with total eligible costs of \$14,600,000 to be funded under the Canada—Prince Edward Island Small Communities Fund (SCF) Funding Agreement (FA) under the New Building Canada Fund (NBCF).

# **HIGHLIGHTS/KEY CONSIDERATIONS**

- On May 30, 2019, the Province of Prince Edward Island submitted a signed copy of Project List 3, which includes one new project.
- Summary Report #3 has been reviewed by INFC to confirm eligibility. Based on the information provided to INFC, which has been attested to by the provincial officials (Annex B), the project is eligible under the SCF.
- INFC officials and the Project Review Panel (PRP) reviewed the project list and confirm that the project is within your delegated authority and that Treasury Board approval is not required. Accordingly, the PRP supports the proposed recommendation that you may sign Summary Report #3 for funding the project under the SCF in Prince Edward Island (Annex C).
- Prince Edward Island's total allocation under the SCF is \$27,703,985. The project in Summary Report #3 represents a federal investment of \$4,866,667. Following your approval of this list, Prince Edward Island will have \$19,827,125, (72 percent) remaining under the SCF, including their administrative allocation.

# **Risks and Mitigation**

 While there is always the possibility for project delays or cost overruns with any infrastructure project,

The SCF FA commits

Prince Edward Island to ensuring that Ultimate Recipients complete projects as approved and assume responsibility for any cost overruns.

#### WebCIMS #

### **KEY BACKGROUND**

- The Provincial-Territorial Infrastructure Component (PTIC) of the New Building Canada Fund (NBCF) dedicates 10 percent of the overall funding envelope, representing a federal contribution of \$1 billion across Canada, for projects benefitting communities with populations of 100,000 or less.
- As per the process identified in the program terms and conditions for project identification, selection and approval, Prince Edward Island has submitted project data and a description to the federal Co-chair of the Oversight Committee (OC) established under the FA. Provinces and Territories are responsible for the project selection process and overseeing the projects. The OC is responsible for monitoring the projects.
- The design of the SCF is significantly different than the PTIC National Regional Projects when it comes to the amount of project information that is received by the Government of Canada. Provinces and Territories provide the Government of Canada with a short project description sufficient for Infrastructure Canada (INFC) to conduct its due diligence for project eligibility under the program. As part of this due diligence, INFC reviews the project list to identify if projects are located on federal lands. The SCF agreements include a clause which indicates that payment is conditional upon Canada being satisfied that the province/territory's obligations under the Canadian Environmental Assessment Act, 2012 (CEAA, 2012) are met.

## RECOMMENDATION

- It is recommended that you approve and sign the attached Summary Report #3
   (Annex A) for funding under the Canada— Prince Edward Island SCF Funding
   Agreement. If you approve, a copy of the signed Summary Report #3 will be shared
   with Prince Edward Island and a joint communications event to announce the
   approval of the projects can proceed.
- INFC publicly committed to adhere to the following service standard for project lists
  within the Minister's delegation: "Approve project list within 25 business days of the
  date the final attested list is received." To meet this service standard, the Minister's
  approval is required by June 28, 2019.

WebCIMS #

## **PROTECTED B**

Kelly Gillis Deputy Minister Infrastructure and Communities	Date
I approve I do not approve.	For discussion.
The Honourable François-Philippe Champagne, P.C., M.P. Minister of Infrastructure and Communities	Date

# **Attachments**

Annex A – Summary Report #
Annex B – Project List Submission Form (signed)
Annex C – Project Review Panel Assessment Note

3 WebCIMS #

## SMALL COMMUNITIES FUND - PROJECT INFORMATION FORM

		Tombstone Information (6 items)				Project Location Information (1 item)	Environmental Asse	essment and Aborigi Items)	inal Consultation (3			Financial	Information (7 is	tems)			Progress Inform	nation (2 items)
Project ID Proj	eject Title	Project Project Description Category	Project Sub- Category	Ultimate Recipient	Ultimate Recipient Type	Project Address	Is any part of the project located on federal lands?	Will Aboriginal groups be consulted about the project?	Is the project subject to an environmental assessment?	Total Eligible Cost	Requested SCF Contribution	Other Federal Contributions (Eligible costs)	If yes, please identify the program(s)		Eligible Recipient Contribution (Eligible costs)	Other Contribution (Eligible costs)	Forecasted Construction Start Date C	Forecasted Construction End Date
2019-SCF- Canad 037 Centre Climat	dian The Unite for to constate Change in St. Pe Adapation The fact of clima approact student	iversity of Prince Edward Island is proposing Innovation struct a 45,000 square foot research facility eter's, PEI.  illity will enable applied research in the field ate change via a highly collaborative ich involving undergraduate and graduate ts, expert faculty and visiting researchers g with community, industry and	Post-secondary research and development laboratories and centres, and related teaching facilities	University of Prince Edward Island	Post- Secondary Institution	St. Peter's, Prince Edward Island	No	Yes	No	14,600,000	4,866,666		0	4,866,667	4,866,667	0	2019-07-01	2021-08-30

Ministers of Infrastructure and Com	munities	
Signature		

Tombstone Information (6 Items)					Project Location Information (1 Item)	Environmental Assessment and Aboriginal Consultation (3 Items)			Financial information (7 items)						Progress Information (2 Items)			
Project Description	Project Falleton	Project 5th	Ula mate Redpler	Ultimate t Resiptant Typ	a Projeci Adoress	le any part of the project located or festeral fands?	a groups be consulted	is the project subject to an environmental assessment?	Teral El (Els) e Cost	Requested SCF Contribution	(Elligible costs)	MACHINA DE	Provincial Contribution (Fig. 45 cods) 4,865,667	(3) (3) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4	Other Contrologist (firgible costs)	7/1/2019	Forester Construction Englisher	
		Post-secondary research and development laboratories and centres, and related teaching facilities	University of Prince Edward Island	Post- Secondary Institution	St. Peter's, Prince Edward Island	No	Yes	No	14,600,000	4,865,667			1,000,000					

- I, Darren Chalsson, Deputy Minister with the Province of Prince Edward Island , declare as follows:
- 1. That the information in this Project Information Form is accurate and valid based on the representations made by the Ultimate Recipient
- 2. And, that Projects submitted in the Project Information Form are deemed to be eligible and viable.

Dated, this 30th day of May 2019

Signature Darren Chaisson, Deputy Minister

PROTECTED B

# MEMORANDUM TO THE DEPUTY MINISTER

# NEW BUILDING CANADA FUND - PROVINCIAL TERRITORIAL INFRASTRUCTURE COMPONENT - SMALL COMMUNITIES FUND AGREEMENT WITH THE PROVINCE OF PRINCE EDWARD ISLAND

# (FOR DECISION)

#### Summary

This note provides you assurance that the Minister may proceed to approve the project listed in Summary Report #3 for the Province of Prince Edward Island under the New Building Canada Fund – Provincial Territorial Infrastructure Component – Small Communities Fund without a Treasury Board (TB) submission. The Project Review Panel (PRP) is satisfied that the project listed in Summary Report #3 for the Province of Prince Edward Island do not require TB approval.

## **Background**

The PRP reviewed the project in the Summary Report #3 for the Province of Prince Edward Island as well as the draft briefing note to the Minister.

#### **Assessment**

# Assessment of TB Approval Requirement

According to the New Building Canada Fund – Provincial Territorial Infrastructure Component (NBCF-PTIC) terms and conditions

the Minister has delegated authority to approve projects and sign contribution agreements where the federal contribution is up to and including \$50 million, subject to certain exceptions. At this review stage of the projects, the PRP has reviewed the materials against the exceptions and confirms that TB approval is not required. However, if during the implementation of a project it becomes apparent that an exception or an exemption has been triggered, then PRP would be advised that a TB submission is required.



# Assessment Against Policy Criteria

The PRP reviewed the project in Summary Report #3 and is satisfied that the project meet all applicable requirements of government policy on the parameters of the program.

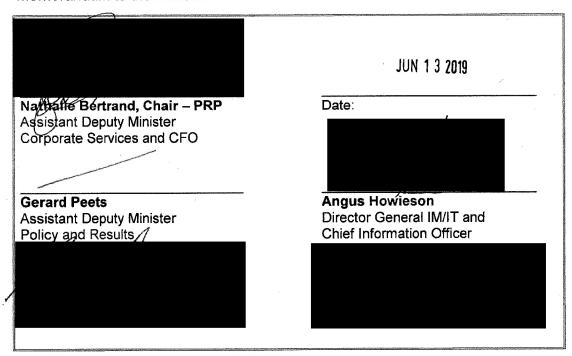
# Assessment of Chief Financial Officer (CFO) Accountabilities

Based on the Summary Report, the PRP confirms that the project:

- ✓ conforms to government policy on the parameters of the program;
- ✓ conforms to Treasury Board policy; and
- ✓ conforms with the terms and conditions of the program.

# Recommendation

The PRP recommends that you support the recommendations in the Memorandum to the Minister.



Prepared by:

Greg Hall
Secretary to the PRP Secretariat



#### BRIEFING NOTE TO THE MINISTER OF INFRASTRUCTURE AND COMMUNITIES

# PROVINCIAL-TERRITORIAL INFRASTRUCTURE COMPONENT SMALL COMMUNITIES FUND IN PRINCE EDWARD ISLAND (PROJECT LIST #3)

(For Signature)

#### **PURPOSE**

 The purpose of this note is to seek your approval of the attached Summary Report #3 (Annex A) for one new project in Prince Edward Island with total eligible costs of \$14,600,000 to be funded under the Canada— Prince Edward Island Small Communities Fund (SCF) Funding Agreement (FA) under the New Building Canada Fund (NBCF).

#### HIGHLIGHTS/KEY CONSIDERATIONS

- On May 30, 2019, the Province of Prince Edward Island submitted a signed copy of Project List #3, which includes one new project. This project was initially prioritized by the Province on March 29, 2018.
- Summary Report #3 has been reviewed by INFC to confirm eligibility. Based on the information provided to INFC, which has been attested to by provincial officials (Annex B), the project is eligible under the SCF.
- INFC officials and the Project Review Panel (PRP) reviewed the project list and
  confirm that the project is within your delegated authority and that Treasury Board
  approval is not required. Accordingly, INFC recommends and the PRP supports the
  proposed recommendation that you may sign Summary Report #3 for funding the
  project under the SCF in Prince Edward Island (Annex C).
- Prince Edward Island's total allocation under the SCF is \$27,703,985. The project in Summary Report #3 represents a federal investment of \$4,866,666. Following your approval of this list, Prince Edward Island will have \$20,106,298.23, (73 percent) remaining under the SCF, including their administrative allocation.

WebCIMS #: 51677

# **Risks and Mitigation**

• While there is always the possibility for project delays or cost overruns with any infrastructure project,

The SCF FA commits

Prince Edward Island to ensuring that Ultimate Recipients complete projects as approved and assume responsibility for any cost overruns.

#### **KEY BACKGROUND**

- The Provincial-Territorial Infrastructure Component (PTIC) of the New Building Canada Fund (NBCF) dedicates 10 percent of the overall funding envelope, representing a federal contribution of \$1 billion across Canada, for projects benefitting communities with populations of 100,000 or less.
- As per the process identified in the program terms and conditions for project identification, selection and approval, Prince Edward Island has submitted project data and a description to the federal Co-chair of the Oversight Committee (OC) established under the FA. Provinces and Territories are responsible for the project selection process and overseeing the projects. The OC is responsible for monitoring the projects.
- The design of the SCF is significantly different than the PTIC National Regional Projects when it comes to the amount of project information that is received by the Government of Canada. Provinces and Territories provide the Government of Canada with a short project description sufficient for Infrastructure Canada (INFC) to conduct its due diligence for project eligibility under the program. As part of this due diligence, INFC reviews the project list to identify if projects are located on federal lands. The SCF agreements include a clause which indicates that payment is conditional upon Canada being satisfied that the province/territory's obligations under the Canadian Environmental Assessment Act, 2012 (CEAA, 2012) are met.

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#### **RECOMMENDATIONS**

- It is recommended that you approve and sign the attached Summary Report #3
   (Annex A) for funding under the Canada Prince Edward Island SCF Funding
   Agreement. If you approve, a copy of the signed Summary Report #3 will be shared
   with Prince Edward Island and a joint communications event to announce the
   approval of the projects can proceed.
- INFC publicly committed to adhere to the following service standard for project lists within the Minister's delegation: "Approve project list within 25 business days of the date the final attested list is received." To meet this service standard, the Minister's approval is required by June 28, 2019.

Kelly Gillis Deputy Minister Infrastructure and Communities	<u>Suc 19/18</u> Date
I approve.	For discussion.  JUN 2 7 2019
The Honourable François-Philippe Champagne, P.C., M.P. Minister of Infrastructure and Communities	Date

#### Attachments:

Annex A – Summary Report #3

Annex B – Project List Submission Form (signed)

Annex C - Project Review Panel Assessment Note

#### SMALL COMMUNITIES FUND - PROJECT INFORMATION FORM

Project Tile Contribution (Eligible costs) Project Ti		Tombstone Information (6 items)					Project Location Information (1 item)	Information (1 Environmental Assessment and Abo					Financial Information	(7 items)			Progress Inf	formation ( ims)
19-9CF Canadian The University of Prince Edward Island Is proposing to construct a 45,000 square foot Climate Change research facility in Expert Acadity and visiting researchers working with community, industry and segment and expert Acadity in Expert Acadity and visiting researchers working with community, industry and expert Acadity in Expert Acadity and visiting researchers working with community, industry and expert Acadity in Expert Acadity and visiting researchers working with community, industry and expert Acadity in Expert Acadity and visiting researchers working with community, industry and expert Acadity in Expert Acadity and visiting researchers working with community, industry and expert Acadity in Expert Acadity and visiting researchers working with community, industry and expert Acadity in Expert	- III Color vile	Project Description		Project Sub-	Ultimate Recipier			project located on	groups be consulted	to an environmental	Total Eligible   F Cost	tequested SCF Contribution	Contributions (Eligible costs) identify the program(s)	Contribution (Eligible costs)	Recipient Cost (Eligible costs)	Contribution	Construction Start Date	Construction End Date
14,600,000 4,866,667 0 4,866,666 0	SCF- Canadian Centre for Climate Change and Adapation	The University of Prince Edward Island Is proposing to construct a 45,000 square foot research facility in St. Peter's, PEI.  The facility will enable applied research in the field of climate change via a highly collaborative approach involving undergraduate and graduate students, expert faculty and visiting researchers	Innovation	Post-secondary research and development laboratories and centres, and related teaching	University of Prince Edward Island	Post- Secondary	St. Peter's, Prince	No	Yes	No				4,866,667	4,866,666		7,172019	6/30/20

- I, Darren Chaisson, Deputy Minister with the Province of Prince Edward Island , declare as follows:
- 1. That the information in this Project Information Form is accurate and valid based on the representations made by the Ultimate Recipient
- 2. And, that Projects submitted in the Project Information Form are deemed to be eligible and viable.

Dated, this 30th day of May 2019

Signature

Darren Chaisson, Deputy Minister

#### SMALL COMMUNITIES FUND - PROJECT INFORMATION FORM

						Project Location Information (1 Item)	Environmental Assessment and Aboriginal Consultation (3 Items)			Financial Information (7 Rems)							Progress Information (2 Items)	
roject (D) Project Title D19-SCF- Canadian Centre for	Project Description The University of Prince Edward Island is proposing to construct 45,000 square foot research facility.	Project Category Innovation	Project Sub- Category Post-secondary research and	Ultimate Recipient University of Prince Edward	Ultimate Recipient Type Post- Secondary	Project Address St. Peter's, Prince Edward Island	Is any part of the project located on federal lands?	Will Aboriginal groups be consulted about the project?	Is the project subject to an environmental assessment?	Total Eligible Cost 14,600,000	Requested SGF Contribution 4.866,666	Other Federal Contributions (Eligible costs)	if yes, please identify the program(s)		Eligible Recipient Contribution (Eligible costs) 4,866,667		Forecasted Construction Start	Forecasted Construction End ( 2021-0
	ge in St. Peter's, PEI.		development laboratories and centres, and related teaching facilities	Island	Institution	COMPLOTISME	No	Yes	No									
tal	Roverbinent			1	1					14,600,000	4,866,666		<u></u>	4,866,567	4,856,667	0		

Ministers of Infragradure and Communities



# MEMORANDUM TO THE DEPUTY MINISTER

# NEW BUILDING CANADA FUND – PROVINCIAL TERRITORIAL INFRASTRUCTURE COMPONENT – SMALL COMMUNITIES FUND AGREEMENT WITH THE PROVINCE OF PRINCE EDWARD ISLAND

# (FOR DECISION)

#### Summary

This note provides you assurance that the Minister may proceed to approve the project listed in Summary Report #3 for the Province of Prince Edward Island under the New Building Canada Fund – Provincial Territorial Infrastructure Component – Small Communities Fund without a Treasury Board (TB) submission. The Project Review Panel (PRP) is satisfied that the project listed in Summary Report #3 for the Province of Prince Edward Island do not require TB approval.

# **Background**

The PRP reviewed the project in the Summary Report #3 for the Province of Prince Edward Island as well as the draft briefing note to the Minister.

#### Assessment

# Assessment of TB Approval Requirement

According to the New Building Canada Fund – Provincial Territorial Infrastructure Component (NBCF-PTIC) terms and conditions

the Minister has delegated authority to approve projects and sign contribution agreements where the federal contribution is up to and including \$50 million, subject to certain exceptions. At this review stage of the projects, the PRP has reviewed the materials against the exceptions and confirms that TB approval is not required. However, if during the

implementation of a project it becomes apparent that an exception or an exemption has been triggered, then PRP would be advised that a TB submission is required.

.../2



# Assessment Against Policy Criteria

The PRP reviewed the project in Summary Report #3 and is satisfied that the project meet all applicable requirements of government policy on the parameters of the program.

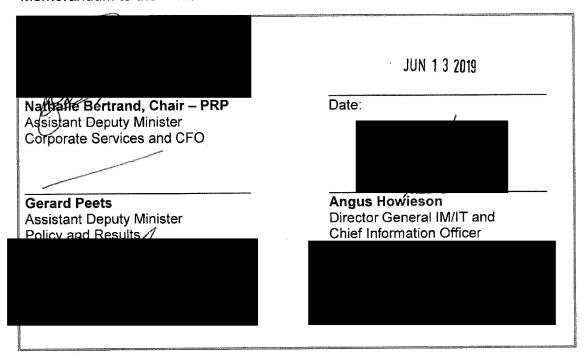
# Assessment of Chief Financial Officer (CFO) Accountabilities

Based on the Summary Report, the PRP confirms that the project:

- ✓ conforms to government policy on the parameters of the program;
- ✓ conforms to Treasury Board policy; and
- ✓ conforms with the terms and conditions of the program.

## Recommendation

The PRP recommends that you support the recommendations in the Memorandum to the Minister.



Prepared by:

*9019* · 06 · 13 **Greg Hall** 

Secretary to the PRP Secretariat